

The Iron Age

A Review of the Hardware and Metal Trades.

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Gear Cutting Attachment for Lathes.

A gear cutter is a tool which almost every shop ought to have, but owing to the fact that ordinary gear cutting engines are large and expensive, they are very much less in use than they should be, and in our smaller shops, and, in fact, in many of the more important, we have to be content with cast gears, unless we can send our castings away to be cut. Except in the largest shops, or those having a special line of work, there is commonly not work enough to justify the expense of one of the complete machines. The attachment which we illustrate, and which is made by the New York Steam Engine Company, No. 98 Chambers street, enables one to convert the ordinary lathe into a machine which will cut all sorts of gears. It consists of a cutter fixed on an adjustable spindle, which also carries a gear that meshes into a carrying gear driven by bevel gears, one of which is on the driving shaft carried by a driving pulley, the carrying gear and pulley partially rotating around the clamping screw post, the whole being set in a proper frame work and clamped to the tool carriage of the lathe. The index plate is made the full diameter of the swing of the lathe, and is held in position by a simple and substantial lever, the plate being made fast to the face-plate of the lathe, and drilled in a suitable manner for all ordinary pitches.

Beside cutting gears of the usual kinds, it will cut spur wheels of any width of face, or fluted rollers. It will cut splines or key-ways on shafting, and do the work accurately. The sizes are adapted to lathes of from 20 to 50 inches swing, but can, by the use of washers, be used on any larger size if desirable. Unless otherwise ordered, these attachments are made to fit the lathes manufactured by the company.

The Law of Trade-Marks and Their Analogues.

BY ROWLAND COX, ESQ.

IV.

In a large proportion of the adjusted cases the question of infringement has been the controlling one, and is, probably, of more interest and of greater practical importance than any other that can arise. It may be justly regarded as, in the main, free from serious difficulty, although its nature is such that it cannot be absolutely controlled by any exact rule. Every case must be, in some measure, governed by its own facts, and the application of accepted doctrine and precedent made to depend upon the circumstances that surround it.

If there be a rule deducible from authority, it may be stated as follows: *Wherever there is a possibility of deception and an intent to deceive, there is infringement.* I am aware that this is a very radical view, which will seem to excite controversy; but it is founded in the most authoritative English adjudications, and is coming to be the recognized doctrine of the American courts. It is undoubtedly true that some of our inferior courts have, in numerous recent instances, decided cases apparently upon the assumption that the rule of law was otherwise. Indeed, several of them have, in effect, directly controverted any theory that supports this view. But when the decisions of the higher tribunals are examined, it will be found that they are, with a very few exceptions, pronounced recognitions of the rule as above stated; and it will also be found that the most recent opinions are essentially progressive in their character, clearly tending toward the only doctrine that can afford a full protection, and the only natural resting place of the subject.

The first American case of moment that involved a discussion of the question of infringement was that of *Partridge vs. Menck*, decided by the court of last resort of New York in the year 1848. Unfortunately, the conclusion arrived at was one by which nearly any colorable evasion may be justified; but it was speedily followed by the masterly opinion of Judge Duer, in the well known *Amoskeag* case, wherein he announced a different doctrine, and established a precedent that has since—theoretically, at least—been of binding force. After a careful examination of the cases, the learned judge thus expresses his convictions:

"In the imitation of the original marks upon an article or goods of the same description, the name of the proprietor may be omitted; another name, that of the imitator, may be substituted; but if the peculiar device is copied, and so copied as to manifest a design for misleading the public, the omission or variation ought to be wholly disregarded. * * An injunction ought to be granted whenever the design of a person who imitates a trade-mark, be his design apparent or proved, is to impose his goods on the public as those of the owner of the mark, and the imitation is such that the success of the design is a probable—or even possible—conclusion."

Without wearying the reader with an enu-

meration of the subsequent cases, it will suffice to state that this view was, substantially, approved in a number of New York decisions, and very cordially endorsed by the Supreme Courts of Connecticut and other States; while the doctrine of *Partridge vs. Menck* was returned to in only a single notable instance of quite doubtful effect. The latest opinions, however, have added to the certainty of the weight of authority, and will show that the language of Judge Duer is the law, as it obtains to-day.

The Supreme Court of Connecticut, in the latest reported decision, states the theory of the rule as follows:

"The fact that careful buyers, who scrutinize trade-marks carefully, are not deceived, does not materially affect the question. It only shows that the injury is less, not that there is no injury. No amount of diligence on the part of the petitioners will guard against this injury. An injunction is their only adequate remedy." *Meriden Brit. Co. vs. Parker*, 39 Conn. 460.

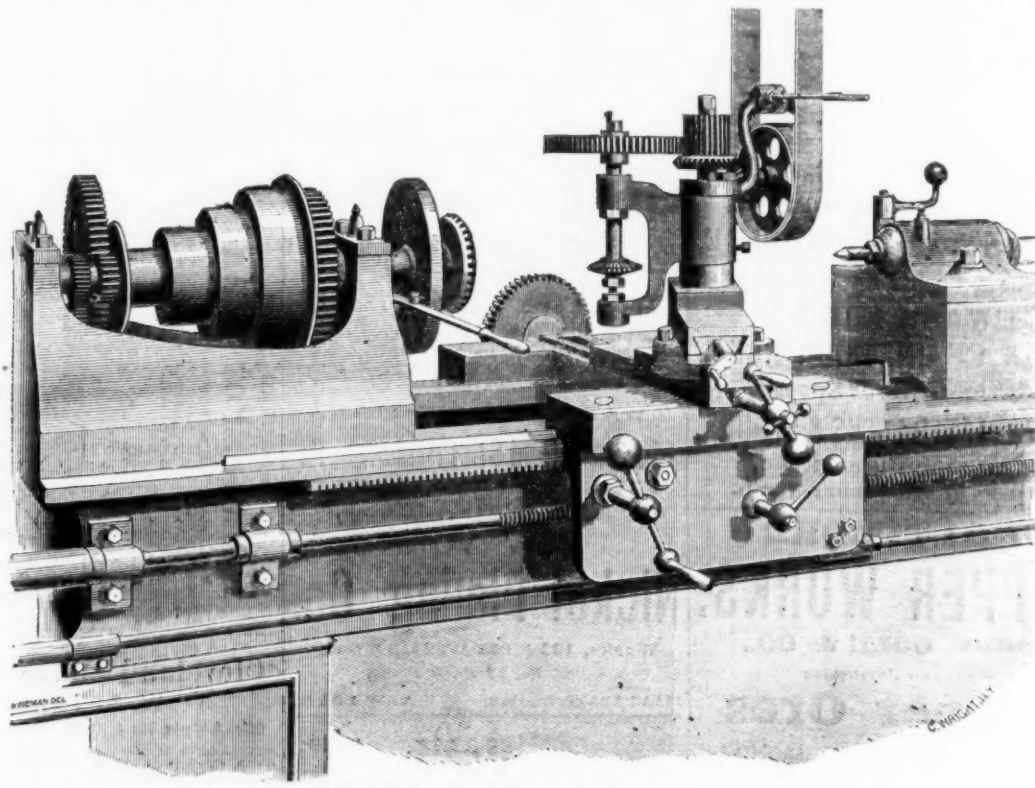
The latest New York case, that of *Lea vs. Wolff*, is equally positive in the affirmation of the same doctrine. Delivering the opinion of the Supreme Court at general term, Judge Fancher writes:

"The adoption of the very words contained

infringement resolves itself into a question of the defendants' intention."

When the English precedents are added to the American, it would seem that there can be no mistake about the correctness of the rule above laid down. But, as intimated, the rulings of the inferior courts appear to keep it in an unsettled form. The reason is, probably, that, as the question is a mixed one of fact and law, the judge inquires, not whether an incautious purchaser would be misled, but whether he would himself fall into error. And as, happily, most of our judges are cautious men, they reach the conclusions stated, losing sight of the fact that the infringer purposely addresses only those whom accident or misfortune has rendered credulous and unwary.

In applying the rule it is only necessary to compare the two marks. In almost every instance the artifice is readily detected, as the wrong doer is compelled to adhere to the *tout ensemble* of the original in order to carry out his nefarious purpose. But in presenting a case to a court it is of the utmost importance that the effect of the simulation be shown by the most conclusive evidence. Unless this is done, there is great danger of the defendant creating sufficient doubt to throw the scales in his favor, even if the case be a very clear one within the rule as above laid down.



GEAR CUTTING ATTACHMENT FOR ENGINE LATHES.

Manufactures of American Tin Plates.

Few people except those directly connected with the tin can and milk trades of the country have any idea of the immense quantity of cans required in handling and transporting milk. Until within a comparatively recent date, the ordinary can made from heavy tin plate was all that was used in the milk business. The almost numberless faults which such cans had, and the severe service to which they were exposed, was a very great hindrance to the prosperity of the trade. Among the faults of the large cans used in dairies was the wear of seams, starting of joints, bending of parts, and a general weakness which no amount of skill on the part of the tinman could remedy. The "Iron-Clad Can," made by the Iron-Clad Can Co., 23 Cliff street, N. Y., which has been in the market some years, has, as it were, not only revolutionized the milk can trade, but is making great strides toward revolutionizing cans, casks, etc., in general use for packages. To trace the history of the "Iron-clad can," and the inventions pertaining to it, as well as the operations through which it passes, would be of great interest, but space is not sufficient to treat of this at length. Some of the points of the can are these: The bottom is struck up out of a heavy piece of metal, and has a rim turned up around the edge, lapping upon the side of the can. Outside of this bottom is a ring having a ledge on its inside, upon which the bottom rests. The body of the can slips down inside the flange, or rim, upon the bottom, and is soldered fast, both outside and in. The bottom joints being thus protected, and the bottom hoop, which forms a chime, being perfectly secure, the can has a strength which can be no better expressed than by the word iron-clad. The demand for these cans is something very enormous, and as the company sell the trimmings, as well as the cans complete, the whole tin trade have gone into the manufacture. The bottoms for what are known as the *Factory Milk Cans* are made of Nos. 16 and 18 iron, American

used. The floating cover, so essential in large cans for preventing the milk from churning in transportation, is now struck up from a single piece of metal. We saw samples of these on a recent visit to the factory, some of which were six inches deep, with perfectly straight sides and no flare, and twenty inches in diameter. This is a great improvement over the old plan of making floating covers, because the seams were always wearing and working, and as soon as there was the least chance for the escape of air the cover would sink. The new cover being made from a single piece of metal, has no joints or seams to leak, and is very much liked on this account.

One of the most serious difficulties which the company encountered was the impossibility of getting tin plate of the size required for the work, because a great deal of their work required odd sizes, and to obtain these, large orders must be given, and at the same time the prices asked were enormous while the delays and trouble of getting them were very great. These reasons induced the company to begin the manufacture of tin plate in odd sizes. If we are not mistaken this company is the first that in this country has turned out tin plate equal to the best imported. They are now filling orders for all odd sizes of plate up to something like 26x48 inches, at rates below the foreign prices of the same goods. In quality, the plates which we have seen show that the American article is in every respect equal to that which is imported, both in finish and quality. During the present season the company intend to make such additions to their works as will enable them to produce plates very much larger than those mentioned. The advantages of having the plate of the exact size needed for the work in hand, is one which all tin workers will appreciate.

In addition to the milk cans, the company produce a large variety of cans for other purposes, applying, however, the same principles of construction to them all. Thus in cans for shipping oil, for holding kerosene, and for gen-

eral shipping purposes, the general features of the milk can are retained, but so modified as to be applicable to the use to which they are to be applied. The company put up a great variety of black goods, and re-tin them, by which the expense of soldering is saved and a better article produced at a lower price than could be obtained in the ordinary method of manufacture.

Moisie Iron.

A recent Treasury decision revives interest in a subject which well illustrates the necessity of constant vigilance by the iron manufacturers of the country in guarding their interests from hostile influences. On the 17th of March the Secretary of the Treasury decided that the Collector of Customs at Ogdensburg, New York, was right in assessing a duty of one and a half cents a pound, less 10 per cent., on certain Moisie iron blooms, imported from Canada, March 2, and refusing to allow them to be entered as pig iron at \$7 a ton, less 10 per cent. The Secretary said:

"The 6th section of the act of February 7, 1875, having placed Moisie iron in the same category for assessment of duty as all other iron, the only question to be determined in this case is, whether the said iron is more advanced than pig iron. On this question it appears that the iron is not known by the designation of iron in pigs, but is involved, and is commonly known, bought and sold as iron in blooms (a stage of manufacture in advance of pig iron), and therefore is liable to duty at the rate prescribed for 'iron in bars,' as assessed under the provision in 'schedule E,' which is as follows: 'But all iron in slabs, blooms, loops or other forms less finished than iron in bars, and more advanced than pig iron, except castings, shall be rated as iron in bars, and pay duty accordingly.'"

Moisie iron is made in Canada, on the north side of the Gulf of St. Lawrence, from a fine black sand, lying about three feet below the ordinary beach sand, and containing over 63 per cent. of metallic iron. A forge with eight fires converts this ore into a very fine quality of iron blooms, which are equal to the best Swedish and Russian charcoal bar and hammered iron for the manufacture of the best cast steel, and come into direct competition in our market with the product of our Lake Champlain forges and with other steel irons. The blandness which could demand that these Moisie blooms should be admitted into our ports as pig iron is most remarkable, but it is thrown completely into the shade by the innocence of a member of Congress, who, not very long ago, standing on the floor of the House of Representatives, held up in his hands the ragged end of one of these blooms and stated that it was only so much pig iron—that is, iron in a primary stage of manufacture, and was therefore entitled to pay duty as pig iron and not as a more advanced product. At the time this statement was made the iron in question was worth twice the value of the best imported pig iron.

The tactics which represented Moisie iron to be pig iron were so far successful as to induce Congress, by the act of 6th June, 1872, to fix the duty at \$15 a ton, which was less than half the duty of 1½ cents per pound, less 10 per cent., imposed on iron of similar quality imported from Sweden and Norway. But this concession did not satisfy the parties interested in the manufacture of Moisie iron, and accordingly, in the winter of 1873-4, they asked Congress to reduce the duty to \$6-30 a ton, the amount then levied on pig iron. Nothing was done in the way of tariff revision at that session; but in January last Congress passed, and on February 7th the President approved an act, known as the "little tariff bill," the sixth section of which reads as follows:

"That section 4 of the act entitled 'An act to reduce duties on imports and to reduce internal taxes, and for other purposes,' approved June 6, 1872, be and the same is hereby amended by striking out the thirtieth paragraph of said section in relation to the duty on Moisie iron, and from and after the passage of this act the duty on Moisie iron, whatever condition, grade or stage of manufacture, shall be the same as on all other species of iron of like condition, grade or stage of manufacture."

To the mind of the Moisie iron manufacturer this section placed his blooms in the same class with pig iron, paying \$7 a ton, less 10 per cent., but to the mind of the Secretary of the Treasury it placed the blooms in the same class with iron in bars, paying 1½ cents a pound, or \$33-60 a ton, less 10 per cent.—quite a difference!

Between the date of the approval of the "little tariff bill" (February 7th), and the approval of the "tax and tariff bill" (March 3d), the above duties, \$7 and \$33-60 respectively, less 10 per cent., were in force. By the terms of the last named act the 10 per cent. reduction was abolished. This explanation accounts for the fact that the Collector of Customs at Ogdensburg was asked to assess a duty of \$7 a ton, less 10 per cent., on Moisie iron imported March 2d, and was sustained in his decision to assess a duty of 1½ cents a pound, less 10 per cent. The duty on this iron since March 3d is 1½ cents a pound.—*Bul. I. and S. Ass'n.*

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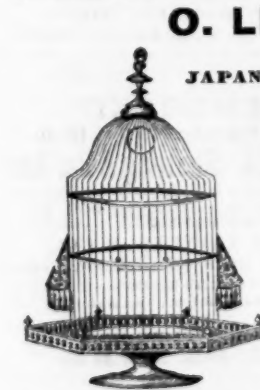
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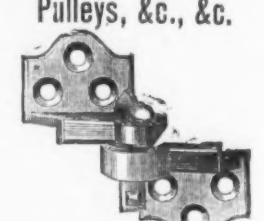
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to yourself and the community

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(as can be seen at a glance) is made

in the only possible way consistent with

strength and durability. A set can be

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seven cents. All the trade know how

great a number of caskets get broken,

in course of a year, in screwing or nailing

them on. This cannot happen with these, as there is

nothing to be done but simply to bore a

small hole with the bit, made specially

for them, and to drive home. They will be more firm on

the furniture than other caskets can be made with

screws. All who have experienced the imperfections of the

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Casket. JNO. TOLIER, SONS & CO.,

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IRON Making in the South.

IRON Making in the South.

CARTERSVILLE, Ga., May 1, 1875.

To the Editor of The Iron Age: In my previous

letter I stated that the manufacture of coke

and hot blast charcoal irons could not at present

be greatly extended in the South, and herein

I shall state my reasons for such assertion.

It is conceded that the long continued depression

in the iron trade has enabled furnace men

in Pennsylvania, Ohio, and elsewhere North

and West, to reduce expenses to a minimum,

which enables them to make iron at a small

profit even at present low rates. At the same

time there are many furnaces so constructed

and so managed that this cannot be done; such

furnaces will lie idle until another "flush time."

It has been previously asserted by enthusiasts

that when such a time as the present came the

South could make pig iron and send it North

or West at a profit. But in this hour of disaster

we find the Southern hot blast charcoal iron

trade as much depressed as that of any other

section. As for the Southern coke iron fur-

naces, there are but three coke furnaces in the

strict Southern iron region, and one works

using coke and raw coal; one more is in process

of construction, and another just fitted for

coke, but never run. The three strictly coke

furnaces are Oakdale, in Roane county, Tenn.;

Barton No. 2, in Barton county, Ga., and the

Chattanooga furnace. The first stopped in

March, 1874, on account of financial troubles

from bad management. The company was

gotten up by two New York life insurance

agents, an ex-Pacific Mail clerk and a young

Wall street broker. They spent \$165,000 of

moneyed capital and failed for \$155,000 of

debts. It has lately been sold under deed of

trust for \$80,000. The stack is 62 feet high and

14 feet bosh. The ore is a rich grade of fossil

red hematite of very peculiar characteristics

and a very superior iron was made. The coal

is within one-fourth to one half a mile of the

stack, and makes a good but friable coke.

From their books I extract the following:

"For week ending April 11, 1874: Coke, 513,-

800 lbs.; ore, 657,400 lbs.; limestone, 131,480

lbs. Product, 140 tons of 2340 lbs., equivalent

to 102 5-10 bushels of coke, 2 1-10 tons of ore

and one-half ton of limestone to every ton of

iron produced."

This ore was delivered at the stack for \$2.50

per ton, limestone at \$1 per ton, and responsi-

ble parties propose to contract to mine the coal,

make the coke and deliver it at the stack for

7 1/2 cents per bushel. Hence pig, made as per

above, would cost for coke, \$7.69; for ore,

\$5.25; for limestone, 50 cents; total, \$13.44;

add \$3 for labor and we have \$16.44. But the

company can make its own coke at less cost

than 7 1/2 cents, as the coal can be mined for 3

cents and delivered at ovens for 1 cent more,

and experiments have proven that 100 bushels

of this coal will make 120 of coke; hence with

such a gain the coke should be made for 6 cents

at most; then, too, the iron can be made with

90 bushels of coke to the ton of pig. This fur-

nace is eight miles from Emory Gap, at which

point the Cincinnati Southern Railroad comes

from the mountains; thence to Cincinnati is

about 270 miles. When the furnace was erected

a narrow gauge railroad was built in another

direction to navigable water on the river;

thence to Chattanooga the pig was regularly

carried by steamboats at \$1.50 per ton. Hence

calling the iron \$17 at the furnace, 50 cents to

the river and \$1.50 down, makes the pig in

Chattanooga at \$19. Of course, if there was

a railroad to Emory Gap more than \$2 would be

saved in transportation on the completion of

the C. S. R. R.; the pig could be hauled by

wagons the eight miles at about same rates as

sent to Chattanooga, hence saying \$2 to Emory

Gap and \$3 to Cincinnati, and we have this iron

in that city at \$22.

Now, I come to the Chattanooga Iron Com-

pany's furnace. The stack as reset since the

flood now stands on iron pillars, and is much

improved. It is 62 feet high and 12 feet bosh.

They use (brown hematites) limonites from

Georgia and Alabama, and fossil red hematite

from Half Moon Island vein on Tennessee

River, about 90 miles above Chattanooga, mix-

ing them half and half. The brown hematites

cost them about \$3.40 in their stock house, and

the fossil ore \$2.50. Their coke comes from

the Suwanee mines, and costs in stock house

10 1/2 cents per bushel. They have made iron

with 90 bushels of coke, and regularly running

on a regular quality of ore they can continue

this and, perhaps, improve. Hence we have as

a cost of pig for them: Two tons of ore, \$5.00;

90 bushels of coke at 10 1/2 cents, \$9.67 1/2; lime-

stone, \$1; labor, etc., \$5; total, \$21.57.

I may have overstated labor and incidentals,

and I am aware that with good management

they can make a ton of iron with 80 bushels of

coke, as such has been done at Barton furnace.

Heretofore, the Chattanooga furnace has been

rather experimenting and testing ores than run-

ning regularly. The finances of the concern

have been well managed, but that, though very

essential, does not constitute all in iron mak-

ing.

The Barton Iron Company's furnaces are four

miles south of Cartersville on the Western and

Atlantic Railroad. The No. 2 furnace runs on

coke; No. 1 on coke and charcoal mixed, and

with probably not run at all after present blast,

as it is an old stack 36 feet high and 9 feet bosh.

No. 3 is 62 feet high and 14 feet bosh; the ore

used is limonite, estimated to cost at stack \$1

per ton and is dug by convict labor from a bed

within one-fourth of a mile of the furnace.

Limestone costs \$2 per ton, and has to be

brought five or more miles by rail. Coke now

used in Suwanee costs about 12 cents per bushel,

delivered at the furnace, and they have made

iron with from 80 to 90 bushels to the ton; they

expect to average 80 this blast. Hence we have

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 used in selecting the ore and grinding it for use. Our
 brand for Flint Glass is unequalled in quality,
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 adapted for the purposes for which they
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New Patents.

We take from the records of the Patent Office
 at Washington the following specifications of
 certain patents lately issued, which will be
 found interesting:

IMPROVEMENT IN PUDDLING FURNACES.

Specification forming part of Letters Patent
 No. 161,317, dated March 23, 1875, issued to
 Enoch Wood, of Pittsburgh, Pa.

Figure 1 is a vertical section of furnace.
 Fig. 2 is a plan view. Fig. 3 is a perspective
 view of the balling tool.

This invention relates to that class of pud-
 dling and balling furnaces wherein the metal
 bed or basin is made to revolve, and, by the
 use of a stationary balling tool the metal, when
 properly worked up, is balled all at once by
 one single operation; and my invention con-
 sists, first, in the novel construction of the ball-
 ling tool; and, secondly, in the novel means for
 excluding air from the rotary basin, all as here-
 inafter specially described and claimed.

For these purposes construct a puddling and
 balling furnace as follows: Change the shape
 of the usual reverberatory furnace by narrow-
 ing its bore at or about the circular metal basin,
 forming a shoulder or offset in the furnace,
 whose projection culminates at about the cen-
 ter of the metal basin. This, by directing the
 heat into the basin and upon the metal, hastens
 and facilitates the operation of puddling. To

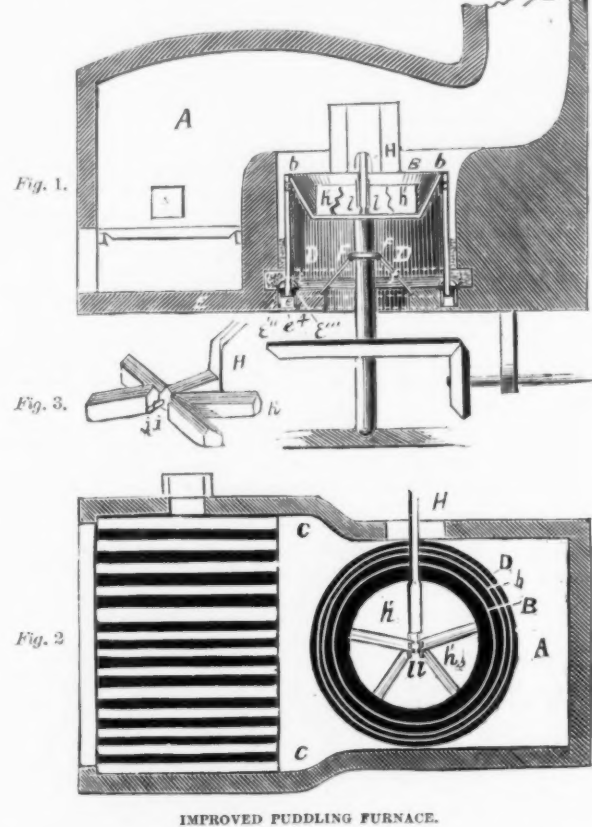
kept rolling and tumbling about until firmly
 balled, when they are ready for the squeezers
 or rolls.

Reference being had to the accompanying
 drawings, A represents a reverberatory furnace
 containing the rotating basin B. At C are
 shown the shoulders or offsets in the side walls
 of the furnace, b b designate the lip or flange
 on the basin B. D is the cylindrical vertical
 flange, extending down into the foundation
 plate E, and having near its bottom down-
 wardly-curved annular flanges e e', overlapping
 the vertical flanges e e' lining the trough d in
 the foundation plate. The central vertical
 shaft F is attached to the metal basin B, and
 rests in a socket in the foundation, being also
 supported by a ring, f, braced by rods f', which
 are constructed with a shoulder to permit them
 to enter only a proper distance into the founda-
 tion plate E. H is the rod or handle of the
 balling tool, furnished with furcated pincles
 i i', upon which hinge the wings h in pairs.
 This tool passes through the slide in the door,
 and is removed in the same manner.

Claim.—1. The balling tool consisting of the
 handle H, with the diverging wings h' pivoted
 or hinged thereon.

2. The combination, with the cylinder D and
 the furnace wall surrounding the same, of the
 intervening annular and joint.

3. The cylinder D, in combination with the
 rotary basin B and the water trough e, said



IMPROVED PUDDLING FURNACE.

the lipped or flanged edge of the circular metal
 basin attach a deep cylindrical flange, extend-
 ing from the lip on the basin down to the founda-
 tion plate, and into an annular groove in the
 same, which is kept filled with sand or water
 by hoppers or pipes adapted for the purpose.

This cylindrical flange, which is vertical, is
 provided near the bottom with downwardly
 curved annular flanges inside and outside, and,
 respectively, overlapping vertical flanges rising
 from the two sides of the annular groove in
 the foundation plate. The purpose of these
 flanges is to exclude slag, cinders, or any
 foreign substance from entering the groove,
 and thereby clogging the same. The cylind-
 rical flange being fastened air tight at its
 top to the lip of the metal basin, and revolv-
 ing with it, and the sand in the groove pre-
 venting access of air, the metal in process of
 puddling is absolutely secure against danger
 arising from the admission of atmospheric air
 or vapors, which might injure the quality of
 the metal, while the air has free ingress to the
 exterior surface of the metal basin for cooling
 purposes. The cylindrical flange serves, also,
 as a partial support for the metal basin. The
 latter is otherwise supported on a central ver-
 tical shaft, held in place by a ring supported
 by rods passing laterally and downwardly into
 the foundation plate. This shaft rests in a
 step or socket below the foundation plate, and
 is fixed to, and revolves with, a beveled wheel
 which meshes with a pinion-wheel fixed to a
 horizontal shaft, the whole so arranged that,
 by turning the latter, the vertical shaft re-
 volves, and thus rotates the furnace bed or
 metal basin.

In the ordinary sliding door construct another
 slide for the admission of the balling-tool.
 The metal is puddled by the stationary flail-
 shaped rabble, and, when ready for balling,
 this is withdrawn, and the balling-tool inserted
 through the slide. This tool consists of a rod
 bent at right angles twice, thus continuing in
 parallel lines. The interior end of the rod is
 enlarged into a heavy plate or wing, so con-
 structed that when lowered into the basin it
 will extend from the circumference to the cen-
 ter of the same. To the end of this are at-
 tached one, two, or more pincles, upon which
 similar wings in pairs, rigidly fixed, are loosely
 hung in such a manner relatively that, when
 spread out in the basin, they form radiuses,
 and divide the basin into three, five, or more
 equal segments, and are also so hung that when
 the tool is lifted from the basin the wings or
 enlargements fall together in a compact form,
 easily removable through the door slide. When
 the metal is puddled this tool is inserted and
 lowered into the mass of molten metal, cuts it
 into three, five, or more equal portions, each of
 which, then, by the rotation of the basin, is

trough being formed in the base of the fur-
 nace.

4. The guard flanges e e', in combination with
 the cylinder D and trough e.

IMPROVEMENT IN COMPOUNDS FOR WELDING STEEL.

Specification forming part of Letters Patent
 No. 161,790, dated April 6, 1875, issued to Ed-
 ward Anthony and Jesse Beadle, of Shick-
 lsbury, Pa.

The nature of this invention consists in a
 compound for welding steel.

In the usual process of converting iron from
 wrought and cast to refined, there is a loss
 that runs to waste from the heating ovens.
 This loss we use, with lime and saltpeter, to
 form the compound, in about the following
 proportions:

Dross..... 89-50
 Lime..... 10-00
 Saltpeter..... 50

These ingredients are pulverized and thor-
 oughly mixed together by any suitable and
 convenient means, and the compound is used
 for welding steel in a common smith's forge,
 in the same manner as borax is now commonly
 used.

The dross, or what is sometimes called cin-
 der or slag, that runs from the heating furnace
 in converting puddler bars into refined iron, is
 the main element of the compound, and acts as
 a flux when pulverized, making the pieces of
 steel into one homogeneous mass, and mixes it
 together, so that when it is rolled or is ham-
 mered the weld is perfect.

This compound may be used for remodeling
 scraps of steel into bars; also, old steel rails
 that are useless and worn out; also, cross ends
 of steel rails into new rails, and to restore the
 nature of the steel after being overheated or
 burnt.

Claim.—The compound for welding steel
 herein described, consisting of dross, saltpeter
 and lime, as set forth.

Rolling Forty-Eight Feet Rails.

The St. Albans Daily Messenger says of the
 new rails now rolled at the large mill in that
 place:

Last October, just before the rolling mill
 shut down for the winter, Superintendent
 Gustin tried an experiment of his own in roll-
 ing out an iron rail 48 feet in length. During
 the winter, while the mill was idle, he devoted
 his spare moments in perfecting and arranging
 his plans, so that when the mill would start up
 again everything would be in readiness to com-
 mence work on the new rail. In the month of
 March the rail mill commenced work, rolling
 out rails 30 feet in length for the Central Ver-
 mont, and afterward for the Cheshire road.

While the company were engaged in rolling
 out the 30 foot rail, a new train of rolls arrived
 from Birmingham, Conn., and were put on the
 lathe in the machine shop, and turned under the
 direction of Mr. Gustin, who is considered one
 of the best draughtsmen and roll turners in
 the country. After the new train was complete
 the company received an order from the Boston,
 Revere Beach & Lynn Railroad, a new narrow
 gauge road, now nearly completed, for a light
 rail 24 feet in length.

The flats that are re-rolled on the night turn
 are run out on an iron buggy. In the morning
 they are taken into the mill and piled on an
 iron buggy; six rail piles are on each buggy,
 the average weight of which is 4650 pounds.
 After leaving the scales they are taken to the
 furnace and charged, the heater placing the
 iron in position to suit himself. The iron re-
 mains in the furnace for about an hour and a
 half when it is brought to a white heat and
 ready to be rolled. The iron while in the fur-
 nace needs extra care as sometimes the iron is
 burned, and turns out to be a poor rail and sent
 back to the shears to be cut up and re-rolled
 again. When everything is in readiness the
 heater who comes on first blows the whistle,
 indicating that he is ready, the roller gives the
 gong rope a pull and the huge engine is set in
 motion. The buggyman places his buggy be-
 fore the furnace, and the heater's helper with a
 large pair of tongs and with four men to help
 him, two on each side, draw the fiery iron on
 the buggy.

The iron is run to the first train of rolls,
 called the roughing rolls. Through these rolls
 it passes eight times, and as it comes out of
 the last pass on the front side it is run over to
 the finishing rolls. As it passes through these
 rolls the rail gradually lengthens, and as it
 comes out of the last pass on the front side,
 the rail is then over 50 feet long. The rail is
 carried then by friction rolls to the saw when a
 boy sets the rail; both ends are here sawed off
 and the rail is sawed once more in the center,
 thereby making two 24 foot rails out of a 48
 foot rail.

The rail is drawn through the friction rolls
 to what is called the sweep, and from there on
 to the hot bed. The sweep can be arranged so
 that the rail can be turned into a semi-circle if
 so desired. It is worked by four set screws.
 After the rail lays on the hot bed for some
 time, it is carried to the rail straightener, on
 rolls, and from there to the clippers and filers.
 It is then taken to the puncher, and from there
 they are loaded on the cars and sent to their
 destination.

The weight of this new rail is 322 pounds,
 40 pounds to the yard; two pounds are al-
 lowed for "wear and tear" through the rail-
 straightener, clipper and filer and punch. The
 weight of the entire rail when 48 feet in length
 is 640 pounds.

This new train of rolls was made expressly
 to roll light iron from 40 to 56 pounds to the
 yard. When the company are working on the
 heavier rail 30 feet in length, these rolls are
 changed and another train set in their place.

The rolling of an iron rail 48 feet long has
 never before been attempted in any rail mill in
 the country; and this rail, thus far, has proved
 a complete success.

Charcoal Iron for the English Market.

Mr. R. P. Sibley, president of the Round
 Mountain Coal and Iron Co., has written the
 following interesting letter to Mr. Swank:

OFFICE OF THE ROUND MOUNTAIN COAL
 AND IRON CO., OF ALABAMA, MOBILE,
 GEORGIA, May 3, 1875.

To the Secretary of the American Iron and
 Steel Association.—DEAR SIR: Your letter of
 April 30th is at hand, and in reply I would
 state that our company made its first shipment
 of pig iron to England last November, which
 was promptly sold to different parties at 47 per
 cent. So far, agricultural works have been the
 principal purchasers, but should England get
 to making cast car-wheels, we expect to build
 up a large trade in that line, as our iron is ex-
 tensively used here by Messrs. Noble Brothers
 & Co. for that purpose. It is also well adapted
 for heavy machinery, chilled rolls, etc., owing
 to its great strength. I am informed that it
 was pronounced by the United States Board of
 Ordnance, in 1853-54, to be the strongest iron
 in the United States, and it is considered by
 several army officers to be very fine for ordn-
 ance purposes. Guns that were made from it
 stood a quadruple charge without bursting.

We have made several shipments to England,
 none of which have brought under 47 sterling
 per ton, and now have iron ready for further
 shipments. We find that at present prices our
 iron nets us as much in England as it would in
 Cincinnati. When our iron is fully tested in
 England, and the iron trade revives, we expect
 to realize a considerably higher price. We
 have received several statements praising it,
 not only on account of its strength, but for its
 valuable chilling properties. It is made from
 fossiliferous ore, which yields about 60 per
 cent. of iron. American charcoal pig iron
 should not be sent to England unless it is
 strong and will chill well, as it would come into
 competition with Swedish and Russian iron.

I know of no English capital invested in any
 furnace either in Alabama or in this State, but
 have heard that some Englishmen are inter-
 ested in Southern ore lands. The Round
 Mountain Coal and Iron Company, of Alabama,
 which made the pig iron that was shipped to
 England, is composed entirely of Georgia
 capitalists. It was organized just previous to
 "the panic," and could, with the expenditure
 of a few thousand dollars, increase its yield
 some 3000 or 4000 tons per annum. The Ridge
 Valley Iron Company, of Georgia, and the
 Cornwall Iron Company, of Alabama, have
 made sample shipments of their pig iron to
 England; the latter company says it intends to
 ship 100 tons soon. Yours, truly,

ROBERT P. SIBLEY, President.

The Pottsville Miners' Journal of the 14 inst.
 says: Tuesday morning Pioneer Furnace No. 2,
 which has not been working well for some days,
 finally chilled in spite of all efforts to prevent.
 Work was at once begun to prepare it for
 working order. The loss in a case of this kind
 is always considerable.

During the past year over \$100,000 worth of
 nickel has been shipped to Wales from Mine
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 rence..... 6.00
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 soluble Silicious Matter in a Limestone..... 10.00
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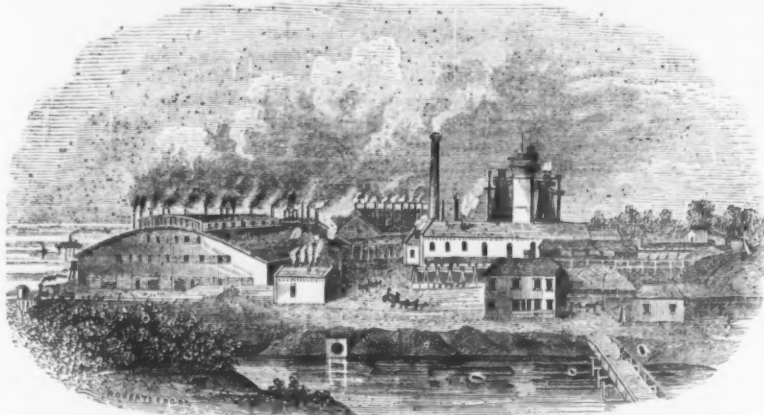
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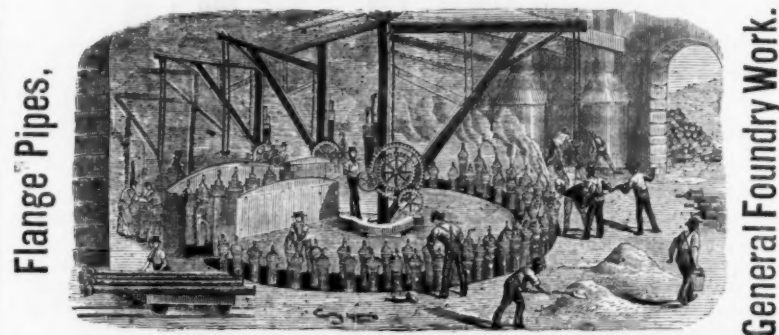
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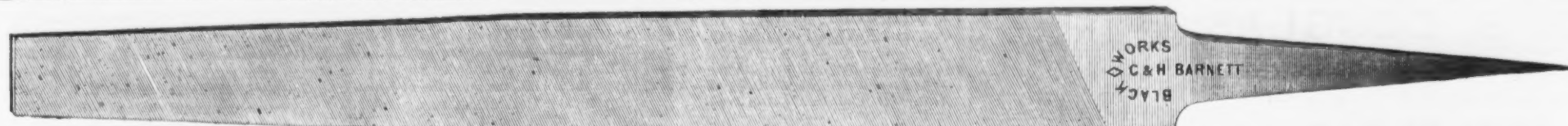
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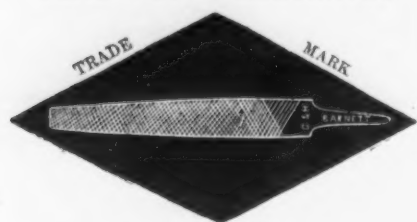
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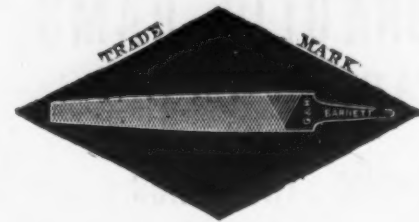
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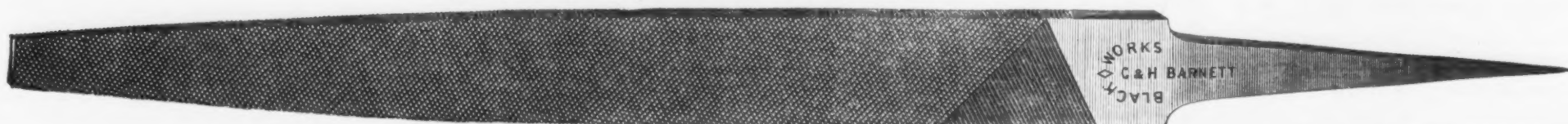
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Pawtucket, R. I.

The American File Company have the exclusive right to use the Bernot process for cutting files. By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth. They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained. No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

Price lists and information furnished on application.

AMERICAN FILE CO., Pawtucket, R. I.

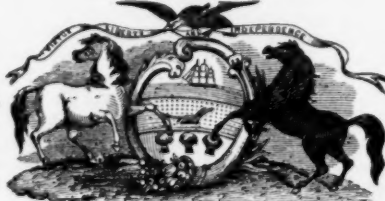
THE BEST IS THE CHEAPEST.

McCaffrey's Standard American Hand Cut Files and Rasps are warranted to do more work than any other files and rasps in the market.

SILVER MEDAL.

TRADE MARK.

HIGHEST PREMIUM.



PENNSYLVANIA FILE WORKS.

McCAFFREY & BRO.,

No. 1732, 1734 & 1736 North Fourth St., Phila.

Messrs. ARNOLD & CO., 312 California St., San Francisco, Sole Agents for the Pacific Coast.

Machinery without Lubricant METALINE.

Machinery Metalined, or Metaline furnished to Machine Builders.

No oil or attention required. Runs with little or no wear. No dirt or danger from fire. No damage to goods in process of manufacture. Years in use by best concerns, who are refilling old, and ordering new machinery to be metalined.

AMERICAN METALINE COMPANY,

61 Warren Street, New York City.

JOHN I. BROWER & SON,

Hardware Merchants,

288 Greenwich Street, NEW YORK.

HORSE SHOES.
Barden's,
Perkins',
Row,
Rhode Island,
Goodenough,
Shoenberger.

HORSE NAILS.

Putnam's,
Globe,
Vulcan,
Ausable,
Ausable Pointed & Polished,
Ausable Pointed & Blued.

HORSE RASPS.

Thos. Turner & Co.,
TOE CALKS,
Winsted,
HAY RAKES,
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PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, Case-Hardened throughout, and not only combine all of the superior qualities of our cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a Combination which has no equal.

For Circulars and Price List, address,

BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass.

L. B. HELLER & CO.,

Manufacturers of Celebrated

American Horse Rasps and Files.

OFFICE, 190 Market Street,
P. O. Box, 223. NEWARK, N. J.ELIAS G. HELLER.
PETER J. HELLER.J. R. DENMAN.
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HELLER & BROS.

NEWARK, N. J.

FILE OR RASP

For the information of persons unacquainted with our goods, we will state that every file or rasp manufactured by us since our establishment in 1866, has been stamped "Heller & Bros., Newark, N. J." though commonly called the "Heller Rasp."

All Rasps not stamped as annexed diagram are not the original, genuine article. The trade will please notice the addition to our trade mark, which was formerly a horse, and is now changed to the trade mark represented by the cut.

Importer and Manufacturer of
Steam Water Gauges,
Pipe and Fittings,
Scotch Glass Tubes,
Tube Expanders,
Twist Drills,
Emery Wheels,
Pipe Fitters' Tools,
Moulders' Tools,
Blacksmiths' Tools,
Machinists' Fine Tools
Forges,
Hammers,
Wheelbarrows,
Wrenches,
Jack Screws,
Vises,
Flue Brushes,
Waste,
Belting,
Hose,
Packing,
Stubs' Goods,
Hair Felt,
Polishing Felt,
Emery Cloth,
Hand Drills,
Iron Punches,
Iron Shears,
Files,
Governors,
Bolts,
SEND FOR PRICE LIST.

Clement & Hawkes Mfg. Co.,
Manufacturers of

SHOVELS,

Planters' Hoes, Trowels and Machinery.
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In Lump, Crushed, Ground, or extra fine, for sale
by pound, barrel, ton or car load, by

SCHWEITZER MFG. CO.,

57 Reade St., N. Y.

STEAM GOVERNOR
WARRANTED BEST IN USE
ADDRESS HUNTON GOVERNOR CO. LAWRENCE MASS.

Established 1816.

Peter A. Frasse & Co.,

95 Fulton Street, New York,

SOLE AGENTS FOR

Thomas Turner & Co.'s Suffolk Works,
SHEFFIELD.

FILES AND HORSE RASPS,

And Importers of

STUBS' FILES, TOOLS & STEEL,

W. J. Davies' Sons' London Emery Cloth,
HUBERT'S FRENCH EMERY PAPER.

EVERY FILE WARRANTED.

Equal to the
BEST.

Western Files. Western Files.

Works, Beaver Falls, Pa.

Office, 96 Chambers St., N. Y.

Western Files. Western Files.

LARGEST CAPACITY

Of any File Works in the World.

In the face of strong prejudice against American files, this brand has earned a reputation second to none. The trade in all sections testify to their excellence. We confidently offer these files as superior in every respect and cheaper than any first-class file in the market. A trial will confirm their reputation.

MINOT & CO., 239 Franklin St., Boston, New England Agents.

FILES
AND
RASPS.

XTRA QUALITY,
MADE FROM THE BEST
IMPORTED STEEL
BY THE
Auburn File Works,
AUBURN, N. Y.

JOHN ROTHERY'S
Celebrated Hand-Cut FILES,

Made of Best English Cast Steel.

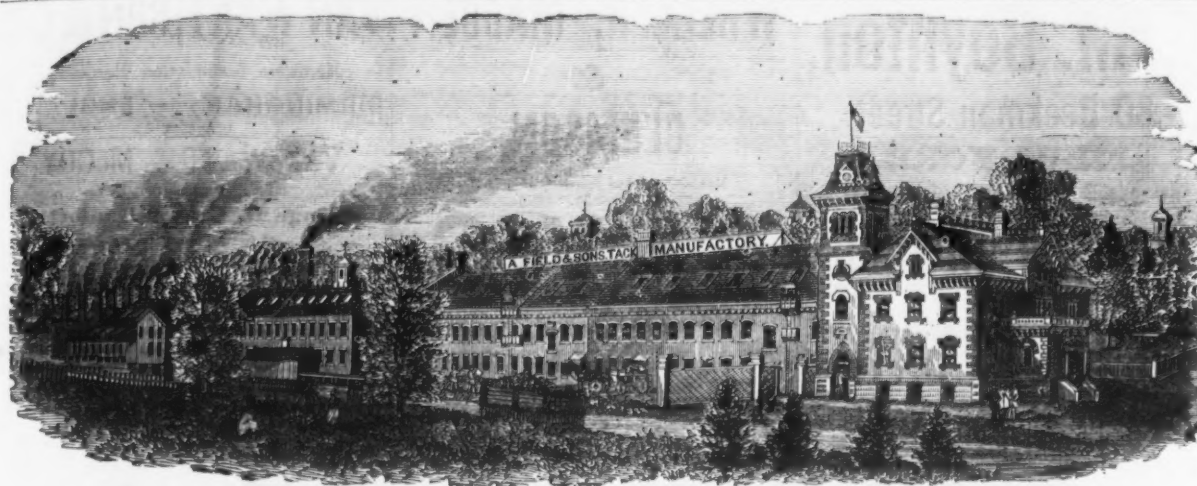
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BEST HAND CUT FILES.

Warranted Superior Quality.

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TAUNTON, MASS., Manufacturers of

Copper and Iron Tacks, Tinned Tacks,

SUPERIOR SWEDES IRON TACKS, for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

American and Swedes Iron Shoe Nails,

Zinc and steel Shoe Nails, Carpet, Brush and Gimp Tacks, Common and Patent Brads, Finishing Nails, Annealed Trunk and Clout Nails, Hob and Hungarian Nails,

Copper and Iron Boat Nails, Patent Copper Plated Tacks and Nails, Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks, Glaziers' Points, etc., etc.

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WAREHOUSE AT 35 CHAMBERS STREET, NEW YORK, where may be found a full assortment of Tacks, Brads, &c. for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above named goods made from samples, to order.

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Hand-Made Locks and Real Bronze Hardware.

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SOLE MANUFACTURERS,

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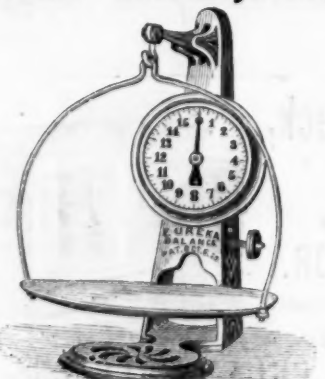
Capital - \$6,000,000, Gold.

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Buys and sells Sterling Exchange, makes Cable Transfers, grants Commercial Credits, and transacts other Banking Business.

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Eureka Self-adjusting



SCALES.

Have a patented attachment for ascertaining the force of a dish or other receptacle used in weighing without the use of weights or loss of time.

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91 & 93 Cliff St., N. Y.

CROCKER BROTHERS,

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Anthracite Pig Irons,

COLD AND WARM BLAST CHARCOAL IRONS,

American and English Bessemer Irons, Iron Ores.

COPPER, TIN, &c.

Advances made on Merchandise.

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YALE LOCKS

FOR ALL USES.

ORNAMENTAL REAL BRONZE HARDWARE.

YALE LOCK MFG. CO., Stamford, Ct.

Salesrooms, No. 298 Broadway, NEW YORK.



BUSINESS ITEMS.

NEW JERSEY.

The name of the Union Iron Company, whose mines are at Chester, Morris county, has been changed to the North Jersey Iron Company, by an act of Legislature. They also have the privilege of locating their furnaces in Morris county if they choose.

Among the most important manufacturing establishments at Camden is that of the Esterbrook Steel Pen Company. Employment is given to about 300 hands, many of the pens passing through 25 distinct operations. This company also manufacture pen boxes and holders.

Work has been resumed at the Trenton Vise and Tool Works with a full force. The American Saw Company, which has been working with reduced force, will soon increase it.

PENNSYLVANIA.

Brady's Edge Tool Factory has been removed from Mount Joy to Lancaster, where improved machinery will be introduced. It was established in 1805.

The Rolling Mills of Jas. Hooven & Sons, at Norristown, are about to resume operations after having been idle for nearly two years, the puddlers having agreed to go to work on the \$4 basis. They go to work with a contract for 1000 tons of iron.

Hopewell Furnace, in Berks county, which has been standing idle for some months past, has commenced operations with charcoal and ore on hand sufficient to keep it in operation for seven months.

It is said the workshops of the Northern Central Railroad Company are to be removed from York to Baltimore, Md.

Abel, Peter & Co., proprietors of the new steel works at Beaver Falls, have contracted for their machinery, J. L. Lewis, of Pittsburgh, securing the contract for rolls, &c.

Dunbar Furnace is blowing away, making foundry iron from native ores exclusively, but will soon make forge iron, as mill cinder and Lake ores are being received. There is a slag granulator at this furnace, and the granulated slag is being sent out every day for the Connellsville Railroad Company.

Mann's Axe Factory, at the Boiling Spring, near Bellefonte, has been leased by Robert Mann, of Mill Hall, and will be managed by Fearon Mann, of Lewistown.

The Charcoal Furnace of Messrs. Barlow & Day, at Lamar, Clinton county, has blown out. It is known as the Washington Furnace, and has a capacity of 1200 gross tons per annum. In connection with the furnace is a bloomery of eight fires, which has also suspended operations.

The Sophia and one of the Etna furnaces are the only ones now out of blast at New Castle. The former has been entirely remodeled, and is now one of the best furnaces in that city.

The rail mill at the Pennsylvania Steel Works, Baldwin, is to be run day and night shortly.

One hundred and seventy-five tons of rails are turned out at the Pennsylvania Steel Works, Harrisburg, every twenty-four hours. The average when only "day turns" prevailed, was ninety-five tons.

At Roach's shipyard, Chester, two of the eight sloops-of-war, constructed under the act Congress, are building. Both are well under way. The double-turreted monitor, Miantonomah, is also rebuilding, and will be entirely of iron. Her engines and turret will again be used. During the winter five old monitors, the Nansett, Niobe, Cohoes, Modoc and Napa, were broken up at the yard, the iron in them being sold by the government. For this work a large force of men was kept employed during the dull season. There are now in course of construction at the yard three additional iron steamships for the Pacific Mail Steamship Company. They will each have a tonnage of 3500 tons.

Dunbar Furnace, Fayette county, Pa., is blowing away, making foundry iron from native ores exclusively, but will soon make forge iron, as the mill cinder and Lake ores are being received. There is a slag granulator at this furnace, and the granulated slag is being sent out every day for the Connellsville Railroad Company.

MASSACHUSETTS.

The Hopedale Machine Works are to be enlarged by the addition of 26 feet in width their entire length of 150 feet. This company have six months' orders ahead, and are enjoying a high degree of prosperity.

The Knowles Pump Works, at Warren, are building an immense mining pump, the largest in the world, to go on the Pacific Coast. This pump will lift water 1000 feet high. The works at Warren are taxed to their utmost capacity to fill orders now in.

The Fitchburg Machine Company have been very successful with their machinists' tools abroad, in the Canadas, and in the various centers of the Union. They have recently shipped a large order for the Havana Railroad, Cuba. Up to 1872 their machinists' tools were for railroads, but now their orders come in from individual machinists in all quarters of the globe.

The Franconia Iron Company, of Wareham, have a large contract to furnish the iron for the New York suspension bridge.

OHIO.

The Cherry Valley Iron Company, at Leetonia, started their rolling mill in full force a few days ago, giving employment to about 100 men.

Three hundred men are employed at the Cleveland Iron Company's blast furnaces and rolling mill, on the Cuyahoga River. They are making 35 tons of pig metal daily, a quantity of rails and a large amount of merchant iron and fish bar.

The Austin Powder Company, Cleveland, intend to rebuild their works, recently destroyed by an explosion.

The Hall Safe Company, of Cincinnati, turn out 20 safes per day, and it is their intention soon to increase the number of the employees and the amount of work.

The rivet factory at Cuyahoga is largely increased in capacity, and will replace the planing machinery of Babcock & Son. The other mills and factories are doing an increased amount of work, and cheerfulness has generally taken the place of gloom.

Fifty dozen axes per day, beside picks, mattocks, adzes, and broad axes, are being made by the Powell Tool Company, Cleveland.

The Cuyahoga Iron Works have just completed a 2000 pound steam hammer for the Valley Iron Company.

The Variety Iron Works Company, Cleveland, have a number of engines and boilers under way, and a considerable amount of job work on their floors. They are building a 12-ton rail shear for the Valley Iron Works.

The steel works at Martin's Ferry are idle. There will be a change in the management, when they expect to resume operation.

MAINE.

At the foundry and agricultural implement manufactory of F. C. Merrill, Esq., South Paris, they are now making the Pettengill swivel plow and Pettengill's horse hoe and cultivator. Mr. Merrill has just invented a coultter harrow.

VERMONT.

The Industrial Works Company's machinery building, at Springfield, was totally destroyed by fire about three o'clock the morning of the 28th ult. Origin of the fire unknown. The business was formerly carried on under the name of the Co-operative Manufacturing Company. The building was owned by Bruk & Co., and occupied by the Industrial Works Company. Loss total: Insurance on the building, \$3000, divided equally between the Manufacturers, of Newark, Allemania, of Pittsburgh, and Merchants and Mechanics, of Richmond, Va. \$1200 insurance on machinery and stock, \$500 in the Amazon, of Cincinnati, and \$700 in the Citizen's, of Newark. The loss on the machinery and stock will exceed the insurance by over \$2000.

NEW HAMPSHIRE.

A bill in equity has been filed in the circuit court, Portsmouth, for the district of New Hampshire, by the Locomotive Engine Safety Truck Company against the Manchester Locomotive Works for an alleged infringement of a patent owned by the company, originally granted to Alva F. Smith, for an improvement in locomotive trucks.

OREGON.

The Oregon Iron Works, of Portland, have been awarded the contract for building a new revenue steamer for service on the Pacific coast. The vessel is to be a staunch one, 145 feet long, 23 feet beam, with 11 feet depth of hold, and to cost \$92,000, currency.

ILLINOIS.

The Joliet Iron and Steel Company produced the other week 1287 tons of steel ingots, beside 965 tons of rails for the Grand Trunk Railroad of Canada.

ONTARIO.

The extensive foundry owned by Cain & Eldridge, Newmarket, together with a large number of cottages occupied by workmen, was burned May 3. Loss \$25,000; no insurance.

ARKANSAS.

The street railway company at Hot Springs is manufacturing cars at that place for use upon its road.

CALIFORNIA.

The old iron foundry and the sand house of the Central Pacific Railroad shops, in Sacramento, was burned April 24. Loss about \$10,000.

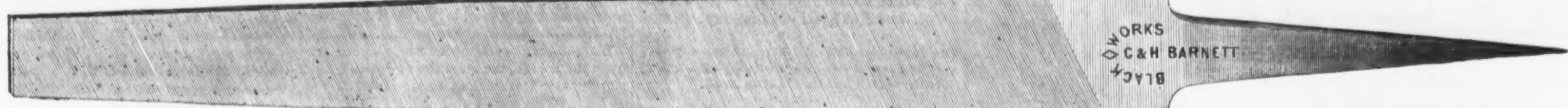
Ice Manufacture.

The Chattanooga Commercial thus describes a new ice factory in that city: The building is rectangular, built substantially of brick, and heavily white coated on the outside. The interior is divided into boiler and engine room, freezing room, storage room and office. There are several longitudinal boilers, in which is generated the ammoniated vapor which is the freezing agent. These boilers connect with the freezing chamber by piping. In this chamber are set, three feet apart each way, 100 perpendicular pipes, about one and one-half inches in diameter and 15 feet high, the whole forming, by means of horizontal pipes at top and bottom, a continuous tube from and back to the boilers. The ammoniated vapor forced constantly, while the factory is in operation, through this circulatory tubing, produces intense cold, several degrees below the point at which ice forms naturally on exposed water. Water is kept falling into this room all the time from a raining apparatus overhead, so nicely regulated that no more falls than is rapidly congealed around the upright pipes as a nucleus. When ice has formed to the extent of about two tons to each column, it is cut away and stored. The capacity of the factory here is about five tons per day, or a total of two hundred tons in forty days.

In quality the ice is the best. We saw there the other day columns three feet thick almost transparent. From actual experiment, it is known to stand transportation with at least no greater loss than the best article of carefully packed lake ice. It has the additional merit of entire freedom from impurities.

The Cedar Point Iron Company's furnace, at Port Henry, improved by the addition of four Whitwell stoves, will be blown in on the 1st of August next. The furnace will be run on Bessemer pig; new red ore (magnetic) and anthracite fuel will be used.

The pig iron industry in England is in a terribly depressed condition. Of 149 blast furnaces in the South Staffordshire district, 79 were, according to the latest mail advices, in blast and 70 out. Of 150 furnaces in the North of England, 135 are blowing and 33 are silent.



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G. & H. BARNETT,

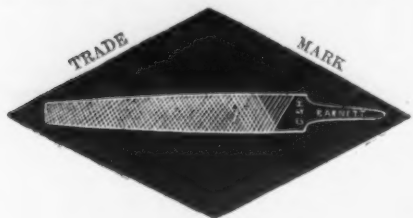
39, 41 & 43 Richmond Street, PHILADELPHIA.

SOLE AGENTS:

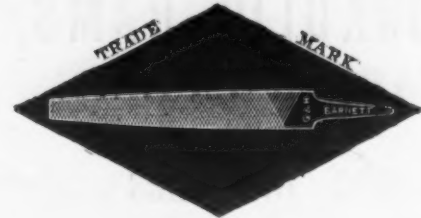
LINFORTH, KELLOGG & CO., 3 & 5 Front St., San Francisco, for the Pacific Coast.

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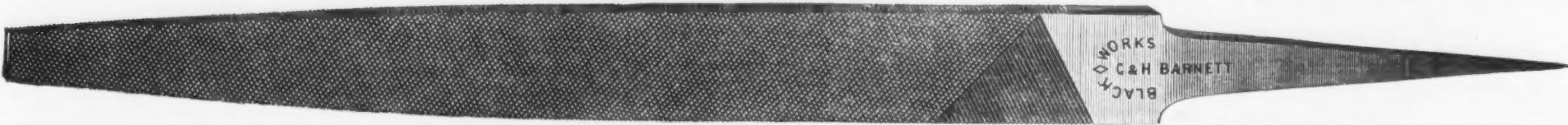
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PRICE LIST.



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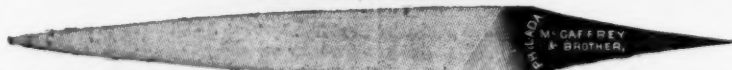
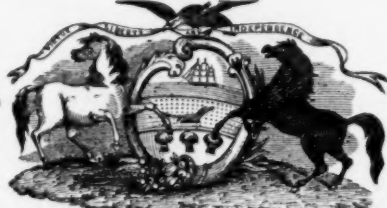
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Wheelbarrows,
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Jack Screws,
Vises,
Flue Brushes,
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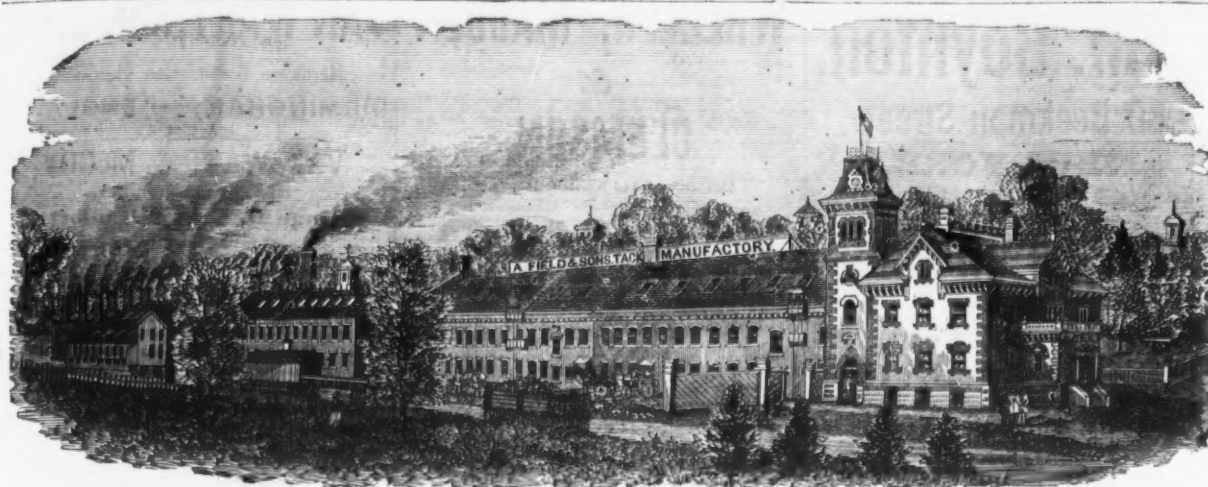
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 Surplus - - \$1,800,000, Gold.

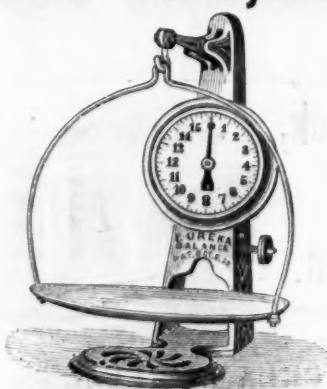
The New York Agency, 50 Wall St.,

Buys and sells Sterling Exchange, makes Cable
 Transfers, grants Commercial Credits, and transacts
 other Banking Business.

J. G. HARPER, Agents.

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Eureka Self-adjusting



SCALES.

Have a patented attachment for ascertaining
 the force of a dish or other receptacle used in
 weighing without the use of weights or loss of
 time.

Manufactured only by
JOHN CHATILLON & SONS,
 91 & 93 Cliff St., N. Y.

CROCKER BROTHERS,
 32 Cliff Street, N. Y.

METALS.

Anthracite Pig Irons,
 COLD AND WARM BLAST CHARCOAL IRONS,
 American and English Bessemer Irons, Iron Ores.
COPPER, TIN, &c.

Advances made on Merchandise.

THE CELEBRATED



YALE LOCKS

FOR ALL USES.

ORNAMENTAL REAL BRONZE HARDWARE.

YALE LOCK MFG. CO., Stamford, Ct.

Salesrooms, No. 298 Broadway, NEW YORK.



BUSINESS ITEMS.

NEW JERSEY.

The name of the Union Iron Company, whose
 mines are at Chester, Morris county, has been
 changed to the North Jersey Iron Company, by
 an act of Legislature. They also have the
 privilege of locating their furnaces in
 Morris county if they choose.

Among the most important manufacturing
 establishments at Camden is that of the Ester-
 brook Steel Pen Company. Employment is
 given to about 300 hands, many of the pens
 passing through 25 distinct operations. This
 company also manufacture pen boxes and
 holders.

Work has been resumed at the Trenton Vise
 and Tool Works with a full force. The
 American Saw Company, which has been
 working with reduced force, will soon in-
 crease it.

PENNSYLVANIA.

Brady's Edge Tool Factory has been removed
 from Mount Joy to Lancaster, where improved
 machinery will be introduced. It was estab-
 lished in 1805.

The Rolling Mills of Jas. Hooven & Sons, at
 Norristown, are about to resume operations
 after having been idle for nearly two years, the
 puddlers having agreed to go to work on the
 24 basis. They go to work with a contract for
 1000 tons of iron.

Hopewell Furnace, in Berks county, which
 has been standing idle for some months past,
 has commenced operations with charcoal and
 ore on hand sufficient to keep it in operation
 for seven months.

It is said the workshops of the Northern Cen-
 tral Railroad Company are to be removed from
 York to Baltimore, Md.

Abel, Peter & Co., proprietors of the new
 steel works at Beaver Falls, have contracted
 for their machinery, J. L. Lewis, of Pittsburgh,
 securing the contract for rolls, &c.

Dunbar Furnace is blowing away, making
 foundry iron from native ores exclusively, but
 will soon make forge iron, as mill cinder and
 Lake ores are being received. There is a slag
 granulator at this furnace, and the granulated
 slag is being sent out every day for the Con-
 nellsville Railroad Company.

Mann's Axe Factory, at the Boiling Spring,
 near Bellefonte, has been leased by Robert
 Mann, of Mill Hall, and will be managed by
 Fearon Mann, of Lewistown.

The Charcoal Furnace of Messrs. Barlow &
 Day, at Lamar, Clinton county, has blown out.
 It is known as the Washington Furnace, and
 has a capacity of 1200 gross tons per annum.
 In connection with the furnace is a bloomery
 of eight fires, which has also suspended opera-
 tions.

The Sophia and one of the Etna furnaces are
 the only ones now out of blast at New Castle.
 The former has been entirely remodeled, and is
 now one of the best furnaces in that city.

The rail mill at the Pennsylvania Steel Works,
 Baldwin, is to be run day and night shortly.

One hundred and seventy-five tons of rails
 are turned out at the Pennsylvania Steel Works,
 Harrisburg, every twenty-four hours. The
 average when only "day turns" prevailed, was
 ninety-five tons.

At Roach's shipyard, Chester, two of the
 eight sloops-of-war, constructed under the act
 Congress, are building. Both are well under
 way. The double-turreted monitor, Miantono-
 mah, is also rebuilding, and will be entirely of
 iron. Her engines and turret will again be
 used. During the winter five old monitors,
 the Nansett, Niobe, Cohoes, Modoc and Napa,
 were broken up at the yard, the iron in them
 being sold by the government. For this work
 a large force of men was kept employed during
 the dull season. There are now in course of
 construction at the yard three additional iron
 steamships for the Pacific Mail Steamship Com-
 pany. They will each have a tonnage of 3500
 tons.

Dunbar Furnace, Fayette county, Pa., is
 blowing away, making foundry iron from native
 ores exclusively, but will soon make forge iron,
 as the mill cinder and Lake ores are being re-
 ceived. There is a slag granulator at this fur-
 nace, and the granulated slag is being sent out
 every day for the Connellsville Railroad Com-
 pany.

MASSACHUSETTS.

The Hopedale Machine Works are to be en-
 larged by the addition of 26 feet in width their
 entire length of 150 feet. This company have
 six months' orders ahead, and are enjoying a
 high degree of prosperity.

The Knowles Pump Works, at Warren, are
 building an immense mining pump, the largest
 in the world, to go on the Pacific Coast. This
 pump will lift water 1000 feet high. The works
 at Warren are taxed to their utmost capacity to
 fill orders now in.

The Fitchburg Machine Company have been
 very successful with their machinists' tools
 abroad, in the Canadas, and in the various
 centers of the Union. They have recently shipped
 a large order for the Havana Railroad, Cuba.
 Up to 1872 their machinists' tools were for rail-
 roads, but now their orders come in from in-
 dividual machinists in all quarters of the globe.

The Franconia Iron Company, of Wareham,
 have a large contract to furnish the iron for the
 New York suspension bridge.

OHIO.

The Cherry Valley Iron Company, at Lee-
 tonia, started their rolling mill in full force a
 few days ago, giving employment to about 100
 men.

Three hundred men are employed at the
 Cleveland Iron Company's blast furnaces and
 rolling mill, on the Cuyahoga River. They are
 making 35 tons of pig metal daily, a quantity
 of rails and a large amount of merchant iron
 and fish bar.

The Austin Powder Company, Cleveland, in-
 tend to rebuild their works, recently destroyed
 by an explosion.

The Hall Safe Company, of Cincinnati, turn
 out 20 safes per day, and it is their intention
 soon to increase the number of the employees
 and the amount of work.

The rivet factory at Cuyahoga is largely in-
 creased in capacity, and will replace the planing
 machinery of Babcock & Son. The other mills
 and factories are doing an increased amount of
 work, and cheerfulness has generally taken the
 place of gloom.

Fifty dozen axes per day, beside picks, mat-
 tocks, adzes, and broad axes, are being made
 by the Powell Tool Company, Cleveland.

The Cuyahoga Iron Works have just com-
 pleted a 2000 pound steam hammer for the
 Valley Iron Company.

The Variety Iron Works Company, Cleveland,
 have a number of engines and boilers under
 way, and a considerable amount of job work
 on their floors. They are building a 12-ton rail
 shear for the Valley Iron Works.

The steel works at Martin's Ferry are idle.
 There will be a change in the management,
 when they expect to re-sume operations.

MAINE.

At the foundry and agricultural implement
 manufactory of F. C. Merrill, Esq., South Paris,
 they are now making the Pettengill swivel plow
 and Pettengill's horse hoe and cultivator. Mr.
 Merrill has just invented a coultter harrow.

VERMONT.

The Industrial Works Company's machinery
 building, at Springfield, was totally destroyed
 by fire about three o'clock the morning of the
 28th ult. Origin of the fire unknown. The
 business was formerly carried on under the
 name of the Co-operative Manufacturing Com-
 pany. The building was owned by Brink &
 Co., and occupied by the Industrial Works
 Company. Loss total: Insurance on the build-
 ing, \$3000, divided equally between the Manu-
 facturers, of Newark, Allemania, of Pittsburgh,
 and Merchants and Mechanics, of Richmond,
 Va. \$1200 insurance on machinery and stock,
 \$500 in the Amazon, of Cincinnati, and \$700 in
 the Citizen's, of Newark. The loss on the ma-
 chinery and stock will exceed the insurance by
 over \$2000.

NEW HAMPSHIRE.

A bill in equity has been filed in the circuit
 court, Portsmouth, for the district of New
 Hampshire, by the Locomotive Engine Safety
 Truck Company against the Manchester Loco-
 motive Works for an alleged infringement of a
 patent owned by the company, originally
 granted to Alva F. Smith, for an improvement
 in locomotive trucks.

OREGON.

The Oregon Iron Works, of Portland, have
 been awarded the contract for building a new
 revenue steamer for service on the Pacific coast.
 The vessel is to be a staunch one, 145 feet long,
 23 feet beam, with 11 feet depth of hold, and
 to cost \$92,000, currency.

ILLINOIS.

The Joliet Iron and Steel Company produced
 the other week 1287 tons of steel ingots, be-
 side 965 tons of rails for the Grand Trunk Rail-
 road of Canada.

ONTARIO.

The extensive foundry owned by Cain & Eld-
 ridge, Newmarket, together with a large num-
 ber of cottages occupied by workmen, was
 burned May 3. Loss \$25,000; no insurance.

ARKANSAS.

The street railway company at Hot Springs
 is manufacturing cars at that place for use upon
 its road.

CALIFORNIA.

The old iron foundry and the sand house of
 the Central Pacific Railroad shops, in Sacramen-
 to, was burned April 24. Loss about \$10,000.

Ice Manufacture.

The Chattanooga Commercial thus describes
 a new ice factory in that city: The building is
 rectangular, built substantially of brick, and
 heavily white coated on the outside. The in-
 terior is divided into boiler and engine room,
 freezing room, storage room and office. There
 are several longitudinal boilers, in which is
 generated the ammoniated vapor which is the
 freezing agent. These boilers connect with
 the freezing chamber by piping. In this cham-
 ber are set, three feet apart each way, 100
 perpendicular pipes, about one and one-half inches
 in diameter and 15 feet high, the whole form-
 ing, by means of horizontal pipes at top and
 bottom, a continuous tube from and back to
 the boilers. The ammoniated vapor forced
 constantly, while the factory is in operation,
 through this circulatory tubing, produces in-
 tense cold, several degrees below the point at
 which ice forms naturally on exposed water.
 Water is kept falling into this room all the
 time from a raining apparatus overhead, so
 nicely regulated that no more falls than is
 rapidly congealed around the upright pipes as
 a nucleus. When ice has formed to the extent
 of about two tons to each column, it is cut
 away and stored. The capacity of the factory
 here is about five tons per day, or a total of two
 hundred tons in forty days.

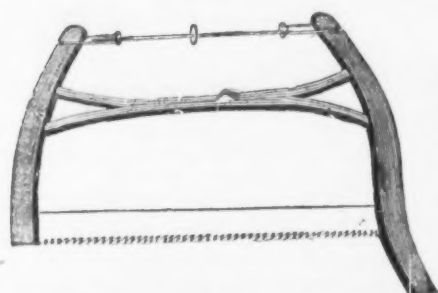
In quality the ice is the best. We saw there
 the other day columns three feet thick almost
 transparent. From actual experiment, it is
 known to stand transportation with at least no
 greater loss than the best article of carefully
 packed lake ice. It has the additional merit
 of entire freedom from impurities.

The Cedar Point Iron Company's furnace, at
 Port Henry, improved by the addition of four
 Whitwell stoves, will be blown in on the 1st
 of August next. The furnace will be run on Bes-
 semer pig; new red ore (magnetic) and an-
 thracite fuel will be used.

The pig iron industry in England is in a ter-
 ribly depressed condition. Of 149 blast fur-
 naces in the South Staffordshire district, 79
 were, according to the latest mail advices, in
 blast and 70 out. Of 150 furnaces in the North
 of England, 125 are blowing and 25 are silent.

GEORGE GUEUTAL & SON,
39 West 4th St., New York.
IMPORTER OF
Wood Screws, Steel in Sheets,
BAND SAWS, TOOLS FOR BRAZING, &c.
Bed Screws, Pin Hinges, and Wire Nails a Specialty.

H. W. PEACE,
MANUFACTURER OF
Saws of all kinds.
FACTORY, WILLIAMSBURG, N. Y.



Elliptic Forked Saw Frame.
Patented June 28th, 1870.

The annexed engraving represents my **ELLIPTIC FORKED SAW FRAME**, which commends itself to the trade for its simplicity of construction. The Forked Frame being all in one piece, without any center bolt, secures for the frame great strength and durability. These frames are put up with my best webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE,
Sole Proprietor & Manufacturer,
VULCAN SAW WORKS.
WILLIAMSBURG, N. Y.

THE SILVER STEEL
DIAMOND CROSS-CUT SAW.
\$1.50 Per Foot. Patent Secured

THIS new Saw, which is destined to take the place of all Cross-cut Saws in point of **SPEED AND EASE**, is manufactured by **E. C. ATKINS & CO., Indianapolis, Ind.**, who are the **SOLE MANUFACTURERS FOR THE UNITED STATES.** So confident are we that this is the best Cross-cut Saw in the market that we **CHALLENGE THE WORLD.** Orders promptly filled.
E. C. ATKINS & CO.
Saw Manufacturers and Repairers, Indianapolis, Ind.

Lloyd, Supplee & Walton,
HARDWARE FACTORS.
MANUFACTURERS OF

Bonney's Hollow
AUGERS.

Stearn's Hollow Augers
and Saw Vises

Bonney's Spoke Trimmers

Double Edge Spoke Shaves

Adjustable Gate Hinges

Scandinavian Pad Locks

Flat Key Brass and Iron Pad Locks, &c., &c.

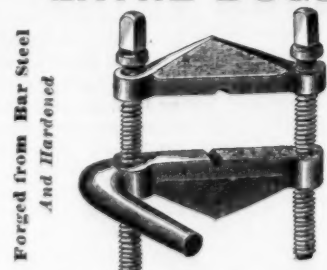
625 Market St., Phila., Pa.

BILLINGS & SPENCER CO.

MANUFACTURERS OF
CLAMP, DIE AND COMMON
LATHE DOGS.



Vicoria, 1873.



FIRST CLASS ARTICLES,
and something that every machinist and Tool Maker will appreciate.
Also, all Descriptions of **Wrought Iron & Steel**

DROP FORGINGS.

For Machine Handles, Lathe Wrenches,
Spinning Rings, Marlin Spikes, Clinch Rings,
Thumb Screws, Thumb Nuts, and Parts of Drill
Chucks, Sewing Machines, Guns, Pistols, and
Machinery Generally.



THE BILLINGS PATENT SEWING MACHINE SHUTTLE,
Thirty Varieties now made, Forged Solid from Bar Steel and Cold Pressed. Also,
Barwick
Wheatcroft



Patent Self-Adjusting PIPE WRENCHES, of all sizes.
Illustrated Circulars and Price List sent to any order on request. **Lawrence St., Hartford, Conn.**

E. M. Boynton,
80 Beekman Street,
NEW YORK,
Manufacturer of

Saws of all kinds.
Also Sole Manufacturer of
LIGHTNING SAWS.

Two Direct Cutting Edges, instead of one Scraping point.



Note extra steel and durability over the old V, out-lined on M tooth.

Telegram Dated Oct. 1st, 1874.

STATE FAIR, EASTON, PA.

To HENRY DISTON & SONS:

Philadelphia, Pa.

I want you to publicly test that challenge on Cross Cut Saws. Name time and place within thirty days. American Institute preferred. **E. M. BOYNTON.**

E. M. Boynton gave on Wednesday of last week an exhibition of what his **Lightning Saw** could do at the Pennsylvania State Fair, in which two men sawed through a sound oak log, 16 inches in diameter, in 17 seconds. Mr. Boynton informs us that his export trade is increasing, he having lately made large shipments of his saws to Australia and other distant markets.—*The Iron Age*, Oct. 8, 1874.

For fuller report of this exhibition see the *Easton Morning Dispatch* of Oct. 1st, 1874.
Henry Diston & Sons cannot furnish **Lightning Saws**. Why do they imitate mine?

J. FLINT,
Manufacturer of
ALL KINDS OF
SAWS
And Plastering Trowels,
ROCHESTER, N. Y.

A large Stock of **Cross Cut Saws** constantly on hand. Orders filled promptly. **Dietrich's Double Handic One Man Cross Cut Saw** made with any kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market. Send for Illustrated Price List.



Putnam's Government Standard
FORGED
HORSE SHOE NAILS.

Manufactured from the best of **NORWAY** Iron, and warranted to give entire satisfaction.

S. S. PUTNAM & CO.,
NEPONSET, MASS.

Rogers' Self-Sharpening
HOE.

The best Hoe in market. It will not batter or break. Wears itself sharp. Will last twice as long as any other Hoe, and is warranted to cut the "Bolles Hoe" or any Hoe in market.

For Sale at Manufacturers' Prices by

RUSSELL & ERWIN MFG. CO., - New York.
BYRNE & FITZSIMONS, - Albany, N. Y.
KENNEDY, SPAULDING & CO., - Syracuse, N. Y.

A. PARDEE, Hazelton, Pa. **J. G. FELL, Phila.**

A. PARDEE & CO.,
303 Walnut St.,
PHILADELPHIA.

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Lehigh Coals.

The following superior and well-known **Lehigh Coals** are mined by ourselves, and firms connected with us, viz.

A. Pardee & Co. { **HAZLETON, CRANBERRY, SUGAR LOAF**

G. B. Markle & Co. { **JEDDO, HIGHLAND.**

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WHEELER, MADDEN
&
CLEMONS,
Manufacturers of Warranted Cast Steel

SAWS

of every description,
including

Circular, Shingle, Cross Cut,
Mill, Hand, Roberts' and
other Wood Saws,

&c., &c

Cast Steel Files

of the well known brand of

Wheeler, Madden & Clemson.

FACTORIES:

Middletown, Orange Co., N. Y.

BRANCH OFFICE:

97 Chambers Street, New York.

BRUNDAGE FORGED HORSE NAILS,

Manufactured from

BEST NORWAY IRON,

by **BRUNDAGE & CO.** Sold by

WHEELER, MADDEN & CLEMONS

Middletown, Orange Co., N. Y.



make a specialty of the **LARGEST SIZES** of Circular Saws, and call particular attention of lumber manufacturers to the following points of excellence:

Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a **DEAD** heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed **BALANCES PERFECTLY**, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time **BEYOND TRUE**. This department is under the personal supervision of myself, who has devoted over twenty years to the art of saw making.

I am sole proprietor and manufacturer of the celebrated "**Challenge**" **Cross-Cut Saw**. Price Lists of all kinds of saws sent on application.

JAMES OHLEN.

V. G. HUNDLEY,

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Manufacturers of

AXE, PICK, GERMAN & AMERICAN

SLEDGE, and other Handles.

Full assortment always on hand.

LE COUNT'S
Pat. Machinists' Tools.

REDUCED PRICES.

Set Iron Dogs, 3/4 to 2 in. \$ 5 00
" " " 2 to 4 in. 12 00
" Steel " 3/4 to 2 in. 6 00
" " 2 to 4 in. 12 00

Iron and Steel Clamps, Die

Dogs, Clamp Dogs,

Vise Clamps, Expanding Mandrels, &c.

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TABLE CUTLERY, Butcher, Painters' and Druggists' Knives

IN GREAT VARIETY

Extra Hard Rubber Handle Table Cutlery of our own Manufacture.

Fine Ivoride Handle Table Cutlery, very White and Durable.

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NORTHAMPTON CUTLERY CO.,

Manufacturers of all kinds

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MANUFACTURERS OF

Pen and Pocket Cutlery, Solid Steel Scissors, F. & L. Shears, Razors,
Russia Leather Straps, Oil and Water Hones, &c.

Sole Proprietors of the renowned full concave patent

"ELECTRIC RAZORS."

Also Agents for the BENCALL RAZORS.

American Table Cutlery, Butcher Knives, &c.

14 Warren Street, NEW YORK. 423 N. Fifth Street, ST. LOUIS, MO.

TABLE KNIVES AND FORKS OF ALL KINDS,
AND EXCLUSIVE MAKERS OF

And the "Patent Ivory" or Celluloid Knife. These Handles never get loose, are not affected by hot water, and are the most durable knives known. Always call for the Trade Mark "MERIDEN CUTLERY COMPANY" on the blade. Warranted and sold by all dealers in Cutlery, and by the MERIDEN CUTLERY CO., 49 Chambers Street, New York.

THE MILLER BROTHERS CUTLERY CO.,

Manufacturers of

PATENT FINE PEN & POCKET CUTLERY
WEST MERIDEN, CONN.

The only Knives made that are put together in such a manner that there is no strain on the covering or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any made, and are acknowledged by English makers as the Best American Knife. We also make

NICKEL & SILVER PLATED POCKET KNIVES

which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal to any other knife. Orders filled from the factory, and in New York by Messrs. J. Clark Wilson & Co., No. 81 Beekman Street (who have a full stock of all patterns always on hand), and also by Messrs. G. B. Walbridge & Co., No. 99 Chambers Street.



BUCK BROTHERS, Millbury, Mass.

The most complete assortment in the U. S. of Shank, Socket Firmer, and Socket Framing Chisels.

PLANE IRONS.

Gauges of all lengths, and circles beveled inside or outside. Nail Sets, Scratch and Belt Awis, Chisel Handles of all kinds. Orders filled promptly; generally same day as received.

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Celebrated Silver Plated Goods,
FORKS, SPOONS, HOLLOWWARE, &c.,

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Price Lists and Discounts mailed on receipt of business card or reference. Address

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MANUFACTURERS OF SUPERIOR

Table & Pocket Cutlery,

WARRANTED TO BE MADE OF THE BEST MATERIAL.

WALKILL RIVER WORKS,

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AMERICAN

PEN AND POCKET KNIVES,

MANUFACTURED BY

PEPPERELL,

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Aron Burkinshaw.

My Blades are forged from the best Cast Steel, and warranted. To me was awarded the GOLD MEDAL of the Connecticut State Agricultural Society, also a Silver and Diploma from the Mass Mechanics' Ass'n Sept. 1860.

Cutlery.



JOSEPH S. FISHER,

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Celebrated I-XL Cutlery, Razors, &c

AGENT FOR

WALTER SPENCER & CO.,

Steel and File Manufacturers,

Rotherham, ENGLAND.

Corporate Mark



Granted 1777

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37 Chambers St., New York,

Agent for

F. W. HARROLD

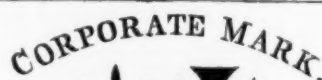
Hardware & Cutlery,

BIRMINGHAM.

JOSEPH ELLIOT & SONS,

Manufacturers of Razors, Table Knives, &c.,

SHEFFIELD.



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CHARLES PEACE, Jr., Agent.

The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam works.

To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear their Corporate Mark.

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REPRESENTING

GEO. WOSTENHOLM & SON,

CUTLERY AND RAZORS,

Washington Works, Sheffield.

CORPORATE MARK.

FREDERICK WARD & CO., Sheffield,

Cutlery and Table Knives.

CORPORATE MARK.

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FURNESS, BANNISTER & CO.

Manufacturers of

Fine Table CUTLERY.

Cor. Nassau & Sheffield Sts.,

NEWARK, N. J.

BACKUS BROTHERS,

Manufacturers of

The Backus Water Motor,

Cor. Wright St. and Ave. A,

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What They will do.

These Motors are adapted to running light machinery, such as Coffee Mills, Printing Presses, Lathes, Drug Mills, Church Organs, Sausage Cutters, Ice Cream Freezers, Elevators, Hoisting Machines and every thing requiring similar power, in cities or towns where there are Water Works.

And the best "Motor" in the world for family sewing machines. Send for Circular.

"DRAW CUT" BUTCHERS' MACHINES.

Choppers, Hand and Power.

Stuffers, and Presses.

Warranted thoroughly made and the BEST IN USE.

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These Motors are adapted to running light machinery, such as Coffee Mills, Printing Presses, Lathes, Drug Mills, Church Organs, Sausage Cutters, Ice Cream Freezers, Elevators, Hoisting Machines and every thing requiring similar power, in cities or towns where there are Water Works.

And the best "Motor" in the world for family sewing machines. Send for Circular.

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Choppers, Hand and Power.

Stuffers, and Presses.

Warranted thoroughly made and the BEST IN USE.

MURRAY IRON WORKS,

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Send for Circular.

How Cheaply can Iron be Made in the United States?

To the Editor of The Iron Age: More than half the entire number of blast furnaces in the country are out of blast. Of those in blast it is safe to say that some are not running at a profit, while very few are earning adequate interest on their investments. This is said to be owing to the low price of iron, and this again to the slack demand, which again resolves itself into a question of demand and supply. Cheap iron makes increased consumption. What is wanted is the ability to produce all the iron which may be called for at just a notch cheaper than any other nation can furnish it to us; and to yield at the same time a reasonable income upon the capital embarked.

How low, then, can pig iron be made in this country, at a profit? We remember seeing statements, made some time before the war, that iron could be made for \$12 per ton. That may have been possible with the low prices for labor then prevailing in favored places; but the current rate for pig iron in our chief markets shows that something over \$20 per ton would be nearer the mark now. At a later date we saw it stated that the materials for a ton of iron could be brought together for about \$10, in the Kanawha Valley, and allowing \$5 per ton for the labor, &c., would leave \$15 as the cost, including the cost of repairs and interest on the capital.

Prof. Ansted, of London; Howell Fisher, of Pottsville; Cyrus Mendenhall, of Cincinnati, and Prof. Ridgway, of Boston, gave their predictions that, in consequence of the richness of the coal seams of the Kanawha, their accessibility, and their nearness to good ore beds, as well as their general relation to water-power, produce fields and the Western iron markets, iron would be made in the Kanawha Valley as cheaply as in any other portion of the country. The first blast furnace erected in the valley was begun soon after the opening of the railroad across the coal field, but its completion was somewhat delayed by the panic of 1873 and the stagnation in trade which followed. Late last autumn, however, it was started in blast. It is situated at Quinimont station, on the Chesapeake and Ohio Railroad, about 300 miles from Richmond and 100 miles from the Ohio River. The ores used are drawn from the massive cliffs on the head waters of the James, at Clifton Forge, 125 miles further east, while the coal is drawn from the hills overlooking the furnace. The small coal and waste is first coked, for which it is very suitable; and the limestone is hauled from the Greenbrier Valley, 50 miles distant. The site of the furnace is convenient to coal and water-power; ores can be had from East or West, but it differs in no important respect from hundreds of other situations with similar or even better facilities on the line of the same road.

The following is a correct transcript of a week's run, vouched for by the superintendent, General St. John, and an eminent banker of New York City, who has recently given the property his personal inspection, with the additional remark that the week's business is not noticeable either for the quantity of metal turned out or for the gross proceeds credited against it:

QUINIMONT FURNACE, WEEK ENDING APRIL 17, 1875.

To 2344 tons coke (native) at \$23.35..... \$547.06
To 4884 tons ore (Virginia) at \$23.90..... 1,147.15
To 241 tons lime (Greenbrier) at \$1.69..... 407.99
Labor..... 425.00
Incidentals..... 92.00

Total..... \$3,212.50

Cr.

By 86 tons No. 1 foundry at \$24..... \$2,064.00

By 48 tons No. 2 foundry at \$22..... 1,056.00

By 23 tons No. 1 mill at \$21..... 483.00

By 27 tons No. 2 mill at \$20..... 540.00

Net earnings..... \$4,143.00

\$4,143.00

The proportion of the better grades of iron is rather larger than usual, though the aggregate make is less. The coke and ores are charged at the same rates as they are sold to other consumers, while the lime is charged at cost. No charge need be added, therefore, for royalty or interest on lands. The iron is credited at the net product after paying freights to Richmond, Pittsburgh or Cincinnati, where it is consumed, say \$5 to \$7 per ton.

It is alleged that the six months' run, notwithstanding all the delays and inconveniences of pioneering the work, will show a similar result to the week above specified. If these facts can be relied upon, we have the important fact that iron can be, and is being, made in the Kanawha Valley at a cost of \$17.50 per ton of No. 1 varieties, and that the average profit, at the present depressed prices, must exceed over \$5 per ton. The furnaces and works are understood to have cost over \$150,000; and on the above showing are yielding over \$50,000 yearly. But, suppose an allowance of \$5000 be made for repairs, relining of furnace and deterioration of buildings, we still have a profit of over 30 per cent. in iron making at this one spot, which is doing pretty well for these times! Is there any locality in the United States which can make a better exhibit?

Centennial Bell and Clock for Independence Hall, Philadelphia.—Henry Seybert, a very patriotic and public spirited citizen of Philadelphia, has made an offer to that city of a very heavy bell and a large clock for use in the tower of old Independence Hall. The bell is to be of Troy manufacture, and, according to contract made with Menely & Kimberly, is to weigh 13,000 pounds—each 1000 pounds representing one of the original 13 States. Like the old "Liberty bell," now broken, this bell will bear the inscription, "Proclaim liberty throughout all the land, unto all the inhabitants thereof," as also another scriptural text, "Glory to God in the highest, and on earth peace, good will toward men." The bell is to be placed in the tower prior to the Centennial anniversary, July 4th, 1876.

The Etna Iron Works.

Mr. John J. Schrack sends the following to the Secretary of the Iron and Steel Association, under date of April 19th:

Having never visited the famous Hanging Rock iron region of Ohio, and desirous of seeing the blast furnaces now in process of erection by the Etna Iron Works, at Ironton, I took a trip there last week, and was well repaid for my time and trouble. A brief description of these furnaces, whose erection indicates a new departure in the manufacture of iron in America, will not be uninteresting to iron masters throughout the country.

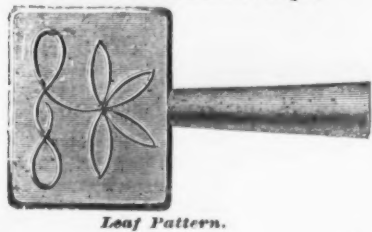
The Etna Iron Works was organized in January, 1873, with George Willard, president, and with a capital stock of \$1,000,000, of which \$350,000 embraced two charcoal furnaces and 30,000 acres of developed ore lands. At the time of the organization of the company it was proposed to build one furnace of the ordinary type of Ohio Valley furnaces. At the request of Mr. Willard, Mr. James P. Witherow, a furnace builder of advanced thought and scientific attainments, visited Ironton, and seeing that the Hanging Rock district, of which Ironton is the center, was destined from its mineral wealth to take a leading part in the future iron developments of the West, and ascertaining that the company wished to work its native coal without the admixture of Pittsburgh coke, proposed three different types of furnaces: first, for working Western fuels alone, he recommended a furnace not over 40 feet high, with some modern exterior improvements; second, a furnace 60 feet high for part coal and part coke; and, third, he recommended them to take a new departure and place themselves squarely in the advance of iron making in the United States by building a plant of self-coking furnaces, the invention of Wm. Perry, of the Monkland Iron Works, Scotland, supported by the Whitwell hot blast stoves, of Stockton-on-Tees, England. He had no hope that the latter suggestion would be adopted. The result of his investigations in St. Louis and elsewhere had convinced him that the iron development of the West had produced no positive results, so far as the mastery of the fuels was concerned, as all the furnaces were sending to Pittsburgh for coke. During a visit to the iron regions of Europe he became satisfied that the self-coking system supported by super-heated air was the real plan of making furnaces profitable. During 1873 these ideas were presented to leading iron men of various iron districts in this country, none of whom would give them any consideration, regarding them as the dreams of an enthusiast. To George Willard, president, and the directors of Etna Iron Works is due the credit of taking a step far in advance of the ordinary manner of making iron at a cost of \$500,000. The company agreed to adopt the ideas if a commission sent to England should report favorably. The commission was sent with Mr. Witherow, and on their return, the report being favorable, the board of directors unanimously resolved to adopt the suggestion, and the building of the furnaces commenced just two weeks before the great financial panic in 1873.

Notwithstanding the panic, and the fact that a large majority of the stockholders were in favor of suspension of operations, work was pushed steadily on, until the enterprise is now near completion.

The work consists of a plant of self-coking furnaces, 87 feet 6 inches high, 27 feet 6 inches diameter of casing, and 18 feet 6 inches in diameter of boshes. Each furnace has four Whitwell hot-blast stoves with a heating surface of over 50,000 square feet, the temperature of the blast to be sustained from 1400 to 1600 degrees. The chimney is 195 feet high and 9 feet in the clear, this height being necessary to create a draft for the thorough combustion or oxidation of gas in the stoves. There will be 12 cylindrical boilers in three batteries, each boiler 64 feet long. In the engine house, which is covered by iron water tanks, there will be five vertical engines of the most approved pattern. The steam hoist tower, which is built of iron columns, will be operated by two engines, each being separate and independent of the other. The stock house will contain bins having a capacity of 10,000 tons. In the stock house there will be constructed four calcining kilns, each 40 feet high, with 35 feet boshes. As the ore comes from the company's mines, by its own narrow gauge road, the 6 ton cars will be hoisted and lowered by friction pulleys, and the ore dropped into the kilns. It is estimated that one ton of coal slack will calcine 30 tons of ore. Limestone may be also calcined, or deprived of its carbonic acid, in the same kilns. This combination of handling and calcining ore, saving labor, etc., apart from other improvements, is calculated to reduce the cost of making iron \$4 per ton. On the whole, these works are the great enterprise of the century in iron making, and if successful, as they have every prospect of being, will create a revolution in iron circles. To understand fully the importance of the work it is only necessary to state that, while these ideas have been in successful operation in England and Scotland, no furnace in Great Britain has all of these improvements—the self-coking top, Whitwell stoves and calcining ovens combined—as is the case at these furnaces. Great credit is due Mr. Willard and the company he represents, that they had the enterprise and nerve to carry out Mr. Witherow's advanced ideas in such a time of depression and pecuniary embarrassments as that through which the country has just passed. It is expected that one of the furnaces will be put in blast in June, when you will receive diagrams and a scientific description of the works. I intended to have given you a short description of the Hanging Rock region, and the furnaces there noted for their excellent cold blast charcoal car wheel iron, but I find I have not the time. I will probably do so in the future. I am under obligations to Messrs. George Willard, J. P. Witherow, H. N. Gray and Fred. Gordon for courtesies received.

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Patent Embossed Steps.



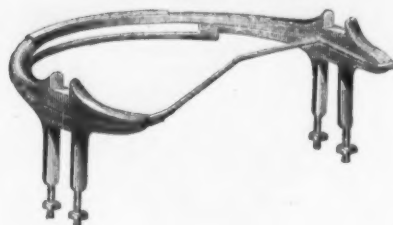
Leaf Pattern.

King Bolt Yokes.



Established 1850.

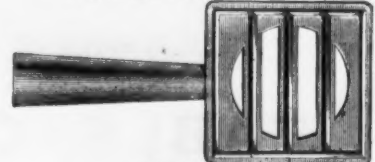
No. 6 Fifth Wheels.



1871 Pattern Shaft Couplings.



Patent Cross Bar Steps.

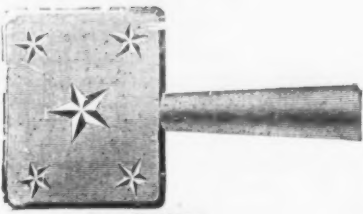
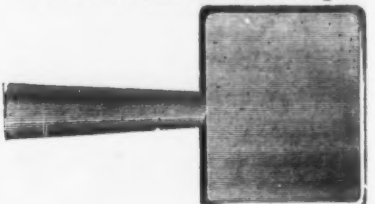


Upper View.



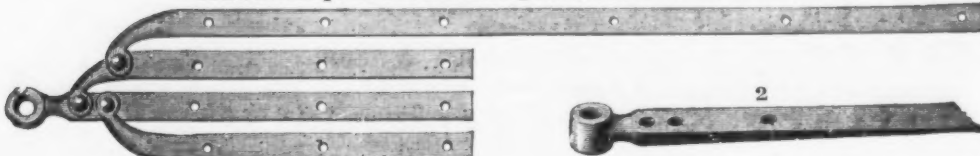
Lower View.

Solid Plain Pattern Steps.



Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.



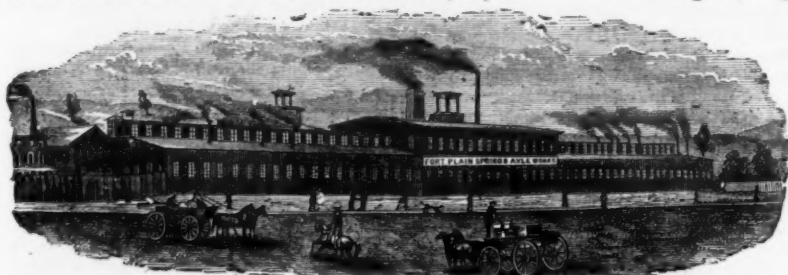
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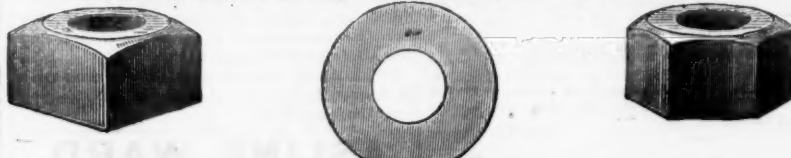
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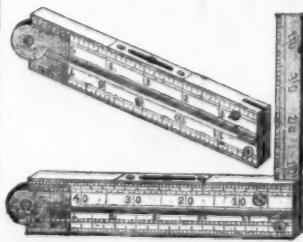
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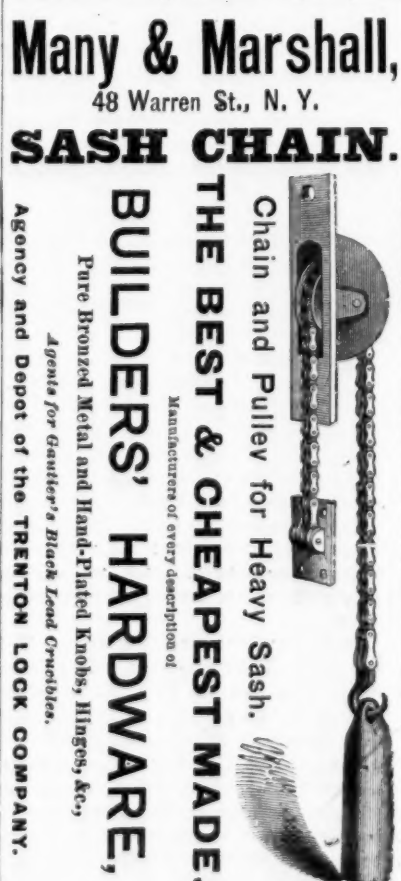


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The Iron Age.

New York, Thursday, May 20, 1875.

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JAMES C. BAYLES - Editor.
JOHN S. KING - Business Manager.

New York, January 2, 1875.

Until the 1st instant the postage on newspapers was paid by subscribers at the office where the paper was received, the yearly rates as follows: Weekly, 40 cents; Semi-Monthly, 40 cents; Monthly, 94 cents. Under the provision of the new postal law, which went into effect on the 1st instant, the rate of two cents per pound for the Weekly, and three cents per pound for the Semi-Monthly and Monthly, will make the postage as follows on the different editions: Weekly, 50 cents; Semi-Monthly, 50 cents; Monthly, 15 cents.

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Tin Plates and Stamped Goods.

The British *Trade Journal* accuses *The Iron Age* of attributing to it some remarks concerning American sheet metal goods in the English market, which it denies having printed. With characteristic good taste it says:

Whether such an article ever appeared in any English publication, and in the course of the editors' operations of the editor has been by mistake attributed to us, we will not undertake to determine. But the singular circumstance of the name of this journal having been given as the authority for any piece of information whatever inclines us to the belief that the alleged article is only a playful American fiction which it was judged necessary to label with the name of a respectable journal to give it currency. We refrain from giving to this puff the currency of our circulation by quoting it at length. But it is proper that we should admit that American stampings are generally better than English, but not better than French. No tin plates, however, are made in the States, and the tin plate stampings produced in America are made from tin plates exported from this country. Very good sheets are made in the States, but not better than those made in England, and the

deep stampings referred to in the puff have been for the most part made from English sheets exported to New York through Liverpool. This iron, such as that used for photographs, has been regularly made in this country as a commercial article for the last thirty years. At present it is unnecessary to say more on this subject, and a sense of duty has made it incumbent upon us not to have said less.

To this we reply as follows:

1. The quotation printed by us was cut from an English paper, and we believe from the *Trade Journal*; at all events, credit was given it in good faith, and we still believe that the editor of the *Trade Journal* will find it if he will search his file.

2d. We do not consider the *Trade Journal* any more "respectable" than any one of twenty English papers, and it is not, so far as we know, considered in this country an authority on any subject.

3d. Tin plates are made in this country which, for the manufacture of large stamped goods, are better than any of British manufacture which have ever come to the United States. Certain classes of articles are stamped from American tin plates which could not be made from any plates of foreign manufacture which are known in this country. We know of one large establishment in this city which uses American tinned iron exclusively in the manufacture of an extensive line of superior goods, and will not again use any foreign plates for any purpose, except small regular sizes.

4th. In the manufacture of stamped goods we are probably as far ahead of France as France is ahead of England. There is at least one house in this city producing stamped goods from tin plates, and from sheet iron to be tinned after stamping, which for excellence of shape, material and finish, can safely challenge the world; and there are many in this and neighboring cities whose products are vastly better than any stamped sheet metal goods ever brought into the United States from abroad. These goods are largely made from English plates, but the fact that they can be profitably exported in very large quantities after being manufactured here, and to markets in which they compete with English, French and German goods, may be accepted as a very fair test of their excellence.

To show what our American manufacturers can do in the way of deep and difficult stamping, we can mention a few pieces which we have seen in stock within the past few days: A pail with vertical sides, 9 inches deep and 18 inches in diameter struck up from a single piece and finished so as not to show a wrinkle. A saucepan-shaped "cooking pot" 7 inches deep, with top and bottom of same size and swelled outward so as to be of greater diameter at center than at top and bottom, struck from single piece of metal. A cylinder 5 1/4 inches in diameter, with a hemispherical head, and 9 inches deep, sides perfectly free from wrinkles, struck from black iron and tinned afterward. This is also struck up from a single piece of sheet metal. A cream pitcher, oval in horizontal and vertical sections, 7 inches high. The diameters at the mouth were respectively 4 inches by 4 1/4. At the largest point below, the long diameter was 6 and the short 5 1/2 inches. This was from the regular stock, stamped from a single piece of black iron and tinned afterward. Of the ordinary work of pans from 8 to 11 inches deep and of large diameters, we might mention many other equally remarkable articles, but it is safe to say that in no other country of the world could those which we have described be made by stamping. Much of this seamless stamped ware is finished so perfectly that it admits of plating with silver and nickel, and will compare favorably with silver plate in brilliancy of surface and elegance of form, although, being essentially cheap goods, they do not admit of hand finishing, and cannot bear the expense of costly trimmings. Nothing like them was ever made in either France or England.

In a word, the *Trade Journal* is talking with unnecessary warmth of a subject which, practically, its editor knows nothing whatever about. If he will favor the United States with a visit on the occasion of our modest little Centennial Exhibition, we shall be able to show him some things he has never seen before, and which will be of interest to his readers. He will learn, among other things, that the only reason we use English tinned iron in this country at all is because it is cheaper in the regular sizes than that made here. Our labor is better paid, and until we shall have invented machinery to do expeditiously the work done in foreign tin plate manufactories by hand, we shall probably continue to consume large quantities of British tin plate. The excellence of many classes of articles which are made up of black iron and finished by tinning, may, however, encourage such progress as will enable us to dispense with tinned plates altogether in stamped goods manufacture.

In that case we shall use our own iron altogether, and will be able to sell our goods all the cheaper in foreign markets.

English Stoves.

In the article upon English grates in our issue of the 18th instant, we called the attention to the expensive character of some of those sent to Australia, but, by an unfortunate typographical error, the prices were given only one-tenth as large as they should have been. The correct figures for the prices of grates of the best character were \$100, \$320 and \$500. In the article alluded we had much to say in praise of the English grates, but when we leave the subject of grates and come to that of stoves, we can find but little to say in the way of commendation. In stoves and ranges the English manufacturer seems to have learned but little during the past twenty years. His inability to make a first-class stove could not be better illustrated than in the recent action of the judges of the Kensington Exhibition in withholding the award of the Society of Arts Prize for stoves.

What would induce an American manufacturer to make a range with an opening 12 or 14 inches square in front of the grate, and leave this opening without a door or any other means for closing it? Yet in the advertisements before us there are several ranges put up with the whole front of the grate permanently open. Three small griddle holes in the top, or "hot plate," seem to exhaust the English stove makers ingenuity, and in many cases one of these is located over the low hot water reservoir.

With large open fires the top of the range must be made without joints, and consequently holes cannot be used for boiling. This open fire arrangement seems to be considered essential, and some allusion is made to it in almost all the advertisements. From the remarks that are made in regard to recent improvements, we conclude that among the defects of the cook stoves and ranges in common use in Great Britain, defective draft and slowness in heating the ovens are most commonly met with. In our judgment, another defect of serious character is ungainliness of shape and general ugliness. The English ranges and cook stoves are as hideous as their open grates and fire-places are beautiful. So far as illustrations and descriptions show, both stoves and ranges have open ash pits, and the only parts provided with doors are the ovens and, in some cases, the upper half of the fire box. They have to be raked with a poker, and no mention is made of either shaking or dumping grates in any style we have lately seen advertised in the English journals. Among those which seem to be most popular are a class advertised as American stoves and ranges, but which are as unlike anything American as can well be imagined. In appearance they look more like American refrigerators with water cooler attachments, than anything we can think of by way of comparison.

One peculiarity of all English cook stoves and ranges seems to be the small oven space provided and the great attention paid to arrangements for roasting on spits. In this country the oven is the feature of every cook stove; but in one of the so-called "American ranges" of English make, there is a small oven on one side of the fire and on the other a hot water reservoir. Thus one-half the heating surface of the fire-box is devoted to heating water which might be heated quite as well in a water-back, or by the waste heat of the flues, as in our low-down reservoirs, leaving space for two ample ovens. Comparing the best and most costly cook stoves and ranges advertised in the English journals with the average of those illustrated in the catalogues of our American founders, one cannot but be struck with the primitive character of the former, and the obvious superiority of the latter in every point. The American housekeeper would laugh at the English "kitchener," and it must be confessed that she would have good excuse for so doing. Awkward, ugly and inconvenient to a degree unapproached in any other class of goods we know of, they are at least half a century behind the standard of American excellence, and it is certainly surprising that, with their undoubted skill and taste, as shown in grates and fire places, the British founders have not been able to impart something of grace of form and beauty of ornamentation to their cooks and ranges.

Of heating stoves and furnaces the English people know very little. Of portable stoves there are but few, and those few seem to be, to a great extent, experimental. Only those with open fronts are acceptable to the public. The Englishman wants to see the fire, as well as feel its warmth, and his prejudice against the closed stove or hot air furnace is somewhat too strong to be readily overcome. All his traditions of domestic enjoyment, all his associations of

social pleasure, connect themselves with the glowing embers and dancing flames, and it will be difficult to persuade him that more comfort and a profitable economy can be attained by abandoning the open fire for a stove or furnace in which the heat is utilized and distributed on scientific principles. At the recent exhibition at Kensington, of which mention has already been made, there were shown a great variety of stoves designed to heat rooms and buildings economically. Most of these were of a character which, in this country, would be considered primitive, but others possessed some elements of novelty, and indicated a progress, tentative as yet, in the intelligent application of principles of construction, which experience in this country has shown to be correct. There will not be much substantial progress in stove founding until there is a public demand for stoves, and probably this demand will not develop until the necessity for economy in the consumption of coal shall become imperative. It is quite unlikely that we shall have any representation of foreign stoves at the Centennial, for the United States affords no market for anything foreign in the heating line except ornamental fire places; but if a few types of the best classes of foreign stoves could be obtained by the National Association of Stove Founders, for exhibition in the stove department of the exhibition, they would be interesting for purposes of comparison, and would serve as foils to make more conspicuous the beauty and utility of our own cooks and heaters.

The Recent Improvement in Domestic Spelter.

In an article on the production and consumption of spelter in the United States, published in our issue of Nov. 26th, 1874, we called attention to the disproportion in the value of domestic and foreign spelter in favor of the latter, and stated our belief that it was due to temporary causes, and could not be long continued. Since then we have noted with pleasure that this struggling industry has been lately making a substantial progress, and that the difference in value between domestic and foreign spelter is fast disappearing. A good many strong prejudices had to be overcome before American spelter could be introduced in successful competition with Silesian. Fortunately, however, our manufacturers are getting in the way of using it, and its consumption has been stimulated by the comparatively high price of copper, which has induced the brass manufacturers to employ the kind of spelter which, quality considered, could be had the cheapest. This created a demand for American which, under other circumstances, would probably have been of slow growth; and now that all prejudice against the domestic spelter is disappearing, we may reasonably expect that it will gradually monopolize the home market, and that Silesian will only be imported for special uses by those who are unwilling to give the domestic spelter a fair trial.

According to the estimates of manufacturers competent to form an intelligent opinion, we shall consume during the current year from ten thousand to twelve thousand tons of spelter, of which it is not probable that more than fifteen hundred tons will be imported, leaving the balance to be supplied by our own works. This will be likely to tax their capacity to its present limit; hence, a still closer approximation in the values of domestic and foreign spelter may be looked for in the near future.

While this change has taken place, partly because of a better understanding among the domestic producers, and partly because of unusually satisfactory financial arrangements with their representatives on the seaboard, the price of spelter in the European markets has tended steadily upward. Although Europe annually produces over 100,000 tons of spelter, or almost ten times as much as, with our yet limited facilities, we are able to make consumption in Great Britain and on the Continent seems to have outrun production, in consequence of the great and increasing variety of uses to which this convenient and comparatively cheap metal is being applied, especially in France. In England the demand for spelter in large quantities is becoming imperative, and extensive preparations are making to render the British market independent of the German and Belgian production by a more extensive development of the Peninsular mines. The calamine which is used in the principal British zinc works comes largely from Spain, where at Carthagena and various places in the North it is calcined. Blende is but little used, for the reason that, in the estimation of the English makers of spelter, it produces an inferior quality of metal. It is doubtful if the American spelter, made from blende, will ever command the full price of the softer metal produced from calamine, but the difference will probably remain so slight

that there will be a sufficient profit on the domestic spelter to encourage the extension of the industry; and should the European consumption fail to keep pace with the consumptive demand, it is not improbable that we may be able to profitably export spelter at no distant day. The industry certainly has a promising future, and we are glad to notice that it is receiving substantial and increasing encouragement.

The Iron and Steel Institute of Great Britain.

The Iron and Steel Institute held their annual meeting on May 5th, at Westminster, Mr. Isaac Lowthian Bell in the chair.

The secretary (Mr. Jones, Middlesbrough) read the report of the Council for the past year, which stated that the progress of the Institute continued to be very satisfactory, the number of members at present on the books being 748, and there were 84 candidates for admissions at the present meeting. The Institute received last year a very courteous and pressing invitation from the Iron and Mining Industries of the United States to visit their respective establishments. Circumstances rendered it impossible for the Council to recommend the acceptance at the time of this offer, but it happened that the president of the Institute, Mr. Bell, was himself able to pay a visit to that country. Although his journey was one undertaken in a strictly private capacity, the Iron masters and coal owners of the United States were pleased to regard him as the representative of the Iron and Steel Institute, and, in consequence, accorded him a reception in every way worthy of the high position it occupies. Next year it is proposed to hold an international exhibition in Philadelphia, and in all quarters a hope was expressed that the Iron and Steel Institute should be properly represented upon that occasion. The Council had awarded the Bessemer medal for 1875 to Dr. Siemens, F. R. S., &c., in recognition of the valuable services he had rendered to the iron and steel trades by his important inventions and investigations.

The chairman, in proposing the adoption of the report, said he was quite sure that those gentlemen who felt an interest in the welfare of the iron trades could not be otherwise than deeply gratified at the flourishing condition of the institution. He then adverted to the forthcoming International Exhibition at Philadelphia, and expressed a hope that members would not be deterred by the voyage across the Atlantic from representing the Institution at the gathering. Having next reviewed the services rendered to metallurgy by the honorary members elected by the council, he called on Dr. Siemens to step to the table and receive the Bessemer medal.

Dr. Siemens then came forward, and was presented with the medal amidst loud applause. Mr. W. Menelaus, South Wales (president elect), seconded the adoption of the report, which was agreed to.

Dr. Siemens briefly returned thanks for the honor conferred on him. It was a gratifying thing to receive acknowledgment for hard work, but the acknowledgment came with greater force from men who were fellow laborers with himself in the same field. He was especially pleased to receive this medal from the hands of their president, who had himself given proof of a deep knowledge of metallurgy, a knowledge which had been recognized by the Institute in awarding him the Bessemer medal.

The chairman, in returning thanks, said that in resigning the presidency into the hands of Mr. Menelaus he did so with the most perfect confidence that that gentleman would prove himself worthy of the distinction, and that his earnestness for the welfare of the Institute would be at least equal to that of him who now left the chair.

ADDRESS OF MR. MENELAUS.

Mr. Menelaus then took the chair and proceeded to deliver his inaugural address as president. He said: Gentlemen, My first duty is to thank you for the very high honor which you have conferred upon me in electing me to fill the office of president of the Iron and Steel Institute. The distinguished nobleman, our first president, who occupied the chair with so much ability and with so much courtesy, was succeeded by a gentleman who, by his brilliant research and great practical experience, taught us the best and cheapest mode of producing pig iron, the quality and cost of which form such an important element in the production of Bessemer and other soft metals. As an iron maker my mission has been to bring into profitable use the valuable invention of Bessemer, Siemens and many others, and to apply the scientific research of men like Mr. Bell to the improvement of old and new processes. In doing this comparatively humble but necessary and useful work, I am pleased to think that I have earned your confidence and esteem, and you may be sure that during my term of office I will always strive to retain both. It is usual on these occasions to read a few words about the progress of the Institute. You have heard that the number of members at the end of 1874 was 748, and amongst them will be found the most distinguished scientific and practical metallurgists of the old and new worlds. So much has been said, and well said, by my predecessors, about the history, the position, and the prospects of English iron making, that I propose on this occasion to confine my remarks mostly to the manufacture of wrought iron and steel, and the application of the latter to constructive purposes. For the conversion of pig into wrought iron the rotary puddling machine in one or other of its forms has occupied the attention of iron makers for many years, and various attempts have been made from time to time to perfect the machine. When under the auspices of this Institute the Danks' machine was introduced into this country success seemed certain. Several machines were erected mostly at and near Middlesbrough, but they seem to have failed, chiefly from defects in mechanical construction. These defects have, I am told, been rectified, and several important improvements have been made in the construction and mode of working the machines. To Messrs. Gills & Co. is due the credit of having first introduced and practically tested these machines in England. The Erius Company followed, and erected extensive works in which the Danks' machines alone are used. Certain difficulties were met with, and no doubt for a time some disappointment was felt. How these difficulties were met and overcome was fully explained in an interesting communication from Mr. John A. Jones, which the president then read. It stated that the company to this day had received the active co-operation from the men which was necessary to the complete success of rotary puddling. At the same time much progress had been made in that direction. The setting of the furnace and the materials

used for the same were no longer questions of difficulty, and in this respect they had no drawback. The mechanical imperfections of the Danks machines were of such a serious character that the repairs had been very costly, and the loss of output by reason of frequent stoppage had affected the cost of production most unfavorably. It was at last agreed that new furnaces of a different construction should be adopted, and to that end one was erected as an experimental furnace. The directors were so satisfied with the work done by this machine that they had ordered five more and six sets of new engines to drive them. Mr. Jones went on to describe the mode of manufacturing puddled bars, at the Erimus Iron Works, and said that at the present time the company were working six furnaces, and they averaged nearly 300 tons per week of puddled, thus giving an output of 50 tons per furnace per week. The present consumption of fuel for actual puddling was 9½ cwt. to the ton of bars. Of fueling (half bought and half from first heating or mill furnaces) 9 cwt. to the ton of bars. The yield of bar from pig was 20 cwt. of pig, 20 cwt. of bars. The whole quantity of coal used to the ton of bars, including reheating, was under 20 cwt. The price paid to the puddlers was at present 5/2 to 4/10 per ton of bars, and the whole of the coal consumed in the puddling department is 15 cwt.; and they anticipated that the wages would not exceed 15/ on the ton of bars, including all labor charges in the puddling department. Continuing his address, the president remarked Mr. Heath, with his usual enterprise, was one of the first to take up in earnest the Danks system of puddling. Mr. Heath informs me that he has had six Danks furnaces at work for some time, and has four additional furnaces ready for work. He is rolling from Danks blooms in the ordinary forge roll, 16 inch bars, 24 ft. long. Mr. Heath states that he is making these bars more cheaply than by the old puddling process, to say nothing of the saving in waste in cutting up long bars as compared with bars one-fourth the length. Mr. Crampton, who has made a long series of experiments on mechanical puddling, having been at work on the subject over five years, has produced some very excellent results as to quality of metal, and he assures me that his experimental machine at Woolwich is working very economically, and it will bear the test of continuous work. He uses his own language: "The furnace is fitted to stand the rough usage to which such a machine must be subjected in ordinary iron works, and it involves a minimum of expense for wear and tear, and for general repairs." Mr. Crampton, in a paper read at the meeting of the Institute at Barrow, in September last, has so fully described his furnace, and the various ingenious appliances connected therewith, that I need not take up the time of the meeting in going over well-beaten ground. Mr. Crampton having in his very able paper exhausted the subject. Several of Mr. Crampton's furnaces are being erected at Middlesbrough, where his plans will be thoroughly tested, probably before our next meeting. I am sure that every member of this Institute must wish Mr. Crampton success. He has for a long period pursued the investigation of a very difficult subject with unflinching zeal, and he has shown much practical knowledge and great mechanical skill in working out his plans. Sir John Alcock has also worked at this problem of mechanical puddling. He is experimenting with the Siemens rotator, and also with a modification of the Maudslayi's machine. Having next adverted to the Perrot furnace, which had been reported to be in fair working condition in France, the president observed: I think that we may now fairly expect that mechanical puddling in the hands of the many distinguished men who are now at work upon it will soon be brought into successful operation; and further, I think that it has been clearly demonstrated that the revolving puddling machine, of whatever type, if properly "fitted" and managed, produces far better results than hand puddling. By this method iron of very excellent quality can be made from pigs containing a large quantity of phosphorus, and I think it not unlikely that the puddling machine will very soon enable us to use largely some of the commoner qualities of pig iron for making steel. In the manufacture of steel, we are making in England by the Bessemer process alone 10,000 tons per week, and the production is rapidly increasing. Various mechanical improvements have been made, which enable us to turn out larger quantities. In some cases as much as one thousand tons per week have been made from a pair of converters. The Americans have set an excellent example in the many ingenious arrangements which they have introduced for getting a large amount of work out of a comparatively small plant. I believe that in this respect they stand at present unrivalled in England. We are following their lead, and we shall soon, I hope, be abreast of them. The president then described the Siemens-Martin process, which enabled them to produce at a moderate cost the same metal as that obtained by Mr. Bessemer's method. Speaking as a manufacturer (he observed), I am of opinion that, with our present knowledge, in no other form can iron or steel be produced at the same cost and of a quality equal to that of the steel made by the Bessemer and Siemens processes.

Our English correspondent, to whom we are indebted for the above, also sends us an abstract of the able and interesting address of Mr. Isaac Lowthian Bell, entitled, "Notes on a Visit to Coal and Iron Mines and Iron Works in the United States." It deals with matters of so much interest to our readers, however, that we prefer to wait until next week, by which time we hope to have received from Mr. Bell the copy of the address in full.

New Publications.

TRAY STOVE WORKS: Catalogue of Stoves manufactured by Burdett, Smith & Co., 233 River street, Troy, New York.

In the matter of paper, type and presswork, this catalogue is exceptionally good, and is a credit both to the firm and their printer. We note the fact that in this catalogue there is considerable space devoted to descriptions of improvements, and to the explanation of the details of stoves. These descriptions are illustrated by diagrams by which the matter is made intelligible even to one not an expert in the trade.

After the usual opening address to patrons, Messrs. Burdett, Smith & Co. make an announcement to the public, which is so full of practical common sense, and so worthy to be in the hands of every man who has a stove to buy or sell, that we copy it bodily:

"In the back of this catalogue will be found the names of manufacturers in Troy and Albany, and all the stoves they produce or furnish repairs for. This list is complete and official, and although their predecessors' names may be on the stove, yet if you have the name, number and kind of stove correct, you will find no difficulty in getting repairs by addressing the firm whose number is opposite name of stove.

"Don't send to Troy firms for Albany repairs, or vice versa, as the cost and time between the two cities is just as great as if situated 100 miles apart. And we might suggest right here, when ordering repairs from manufacturers with whom you have no acquaintance, to send your money with the order; in this way you will be sure to get prompt shipment and a correct return of change.

"We think this list will prove so valuable for reference that we need hardly caution you to keep this catalogue in good order, and where you can always find it."

The list referred to consists of a list of the Troy and Albany stove manufacturers, in which the name of each firm is numbered. Then comes an alphabetical list of the stoves with reference letters, showing what the character of the stove is—range, heater, cook or parlor—and whether for wood or coal. Against each stove is the number of the firm making the stove. The value of such a list to the retail dealer can hardly be overestimated.

The catalogue shows a very large line of ranges, cook stoves, heaters and laundry stoves of new and attractive patterns. We note among a large number of noticeable things that the firm make a great variety of stoves for soft coal and wood. In heating stoves there is a good variety of attractive designs, while in laundry and tailor stoves there is a large representation.

The illustrations indicate a large stock, well adapted to meet the wants of purchasers.

THE COAL TRADE: A compendium of useful information relative to coal production, prices, transportation, etc., with facts for reference corrected to latest dates. Frederick E. Seward, Editor *Coal Trade Journal*. 100 pages.

This volume gives, in a compact form, a vast deal of valuable information in regard to coal and the coal trade, which it would be difficult, if not impossible, to obtain in any other shape. Mr. Seward's extensive practical knowledge of the coal trade gives him unusual facilities for producing a work of this kind, and enables him to give precisely such information as the practical coal man, whether dealer or operator, needs. The form in which the matter is placed is very good, and the information is conveyed in the fewest possible words. A considerable portion of the book is devoted to the different coal fields and the coals which they produce; tables at the close of each section show the statistical position of the coals described. Maps of different coal regions are introduced, together with numerous diagrams illustrating the geological formations. The tables of shipments and receipts at various points are very full, and the details are in convenient shape for reference. In addition to the figures for the anthracite region, statistics are presented of all the coal bearing regions in the United States, and also for many foreign countries, which gives the book a general value as a work of reference. We notice some very valuable tables and much useful information in relation to the coal trade of the Pacific slope, which has heretofore been counted out in most of the works upon the coal trade of the world. In the chapter of "Interesting Facts and Figures," we find a very large "seam" of what we should call first-class matter in as good and convenient shape as could possibly be desired. Taken all in all, the book is one of the most valuable hand books of the kind that we have seen, and the author should find a good demand for it, as he has succeeded in making it as valuable to consumers as to the producer and dealer. The consumer will find in the tables of the analyses of different coals much interesting and valuable information which has not before been in convenient shape, and also a great deal of new matter which is valuable. The remarks upon the qualities of the different kinds of coal are also useful in enabling the purchaser to gain a correct idea of the character of the various coals and the uses to which they are best adapted.

Scientific and Technical Notes.

The *Engineer* says that Mr. William White Cooper, the eminent oculist, has devised a new kind of

SPECTACLES TO PREVENT SNOW BLINDNESS.

"It is well known that a long exposure to the glare of the intense white of the snow in the Polar regions is most harmful to the sight; to meet this difficulty, spectacles of green tinted glass, surrounded by gauze, have been proposed. These will, however, fall in practice, as the glass part of the spectacles is liable to get dim and clouded, while the gauze and the wire, by means of which the spectacles are fastened behind the ears, will in an Arctic climate become so cold that to the human skin they will have the sensation of being made of red hot wire. Mr. Cooper's snow spectacles have neither glass nor iron in their composition, for they are made of ebonite, and are tied on to the head by a velvet cord. They resemble somewhat two half walnut shells fastened over the eye. Their great peculiarity, however, is that the wearer sees through a simple slit in front of the pupil of the eye. The sides of each eye box are perforated with minute holes, in order that the wearer can get a side view of objects. These glasses will also prove useful to travelers by railway, inasmuch as they keep out the glare of the sun, and prevent the admission of dust into the eye. To engine drivers, therefore, they would be invaluable, especially when exposed during sleet, snow storms, or very windy weather. They are also very agreeable when reading at night by lamp or gas light."

If the *Engineer* had been a little better posted in the matter of Arctic affairs, it would have known that Mr. Cooper's invention was not new except in the material employed. The form is probably very old, and has been in use in the Arctic regions for years, and, we believe, was an Esquimaux invention, at least was learned from them. We used a similar device, made from wood, years ago. It would be a great deal better to give the English engine drivers comfortable cabs, and put good headlights on the engines, as we do in this country, instead of proposing to put spectacles on the enginemmen to keep the sleet out of their eyes.

The Krupp breech-loading gun, which has been attracting so much attention recently in the House of Commons, burst at the second round, and now lies in the

"CEMETERY" OF GUNS

In front of the royal gun factories, in the Royal Arsenal, Woolwich, in company with some hundreds of guns of various descriptions which have either prematurely given way or been tested to destruction. Close by it are two of the guns constructed on the Woolwich system, and muzzle loaders, one having endured 2368 and the other 2308 rounds with the full charge of powder and the 64 pounder projectile before bursting, a result which was in each case preceded, according to the habit of wrought iron ordnance, by ample signs of warning, while guns of steel and cast metal seldom give notice of weakness before they actually explode. The Krupp gun has the breech piece snapped sharp off immediately in rear of the breech loading apparatus, while the fragments of the wrought iron gun are wrenched and distorted by great violence, and leave evidence of the obstinate resistance they have offered. The experimental gun which formed the model upon which the Woolwich guns have been designed, is exhibited not at the "Cemetery," but in the park of serviceable artillery at the gun factories, and it bears an inscription, as follows: "Nine inch muzzle loading rifled gun, experimental; Frazer's construction without breech piece, but reinforced with a double coil, thin steel barrel; fired 400 rounds with 30 lb. of rifle large grain powder, and 207 with 43 lb. charges, was then turned over and fired 500 rounds with 40 lb. charges; weight of projectile 250 lb. Total number of rounds, 1107. The gun can still be used, and by the introduction of a new tube can be rendered serviceable."

It is curious to note in regard to the

FIRST FLOATING MILLS.

that when Vitiges, a Gothic king, besieged the great Belisarius in Rome, in 536 A. D., he subjected the city to great sufferings by stopping many large aqueducts. There was no water to drive the corn mills, and it was not till Belisarius floated some mills on boats into the Tiber that the difficulty could be overcome. There is, in some ancient history, a long and detailed account of the various and often ingenious measures that were adopted by the besiegers and the besieged for the attack and defence of these primitive floating corn mills. Flour mills of this description have existed to the present time, and may be seen on the Danube, the Rhine, and other large rivers of the Continent of Europe. For the most part they consist of a wooden structure erected upon a large boat, moved in the rapid current of the stream. Parallel, and at a short distance, another boat of smaller dimensions is placed, and between them a water-wheel is fixed, which is turned round by the current, and by this motive power the grinding of the wheat is effected, and in some cases the meal is bolted on the spot.

There has just been exhibited to the brethren of the Hull Trinity House, and to the principal ship owners of the port of Hull, England,

A NEW LIFEBOAT.

patented by Messrs. Anderson & Burkinshaw, of Burlington Quay, and it is by them termed the "Reversible Lifeboat." The inventors claim for it advantages which no other lifeboat possesses, viz., that it can neither capsize after being launched from a vessel's deck, nor can it sink. As its name implies, it is top and bottom both alike, and if in launching, before it touches the water, it should, by the rolling of the vessel, or any other cause, turn over, there are thrusters and seats running round the side just the same as there would have been had the boat gone in the other way up. Whichever side the lifeboat takes the water, when she is once afloat, a couple of flaps running the whole length will close and form the bottom of the boat, and there is provision for drawing a further flooring out, which will rest upon strong beams. The boat receives its unusual buoyancy from a massive belt of cork, which is encased in canvas, and runs from stem to stern on each side, and 40 separate air-tight tanks, 10 on each side of both the upper and lower part of the boat. Still further buoyancy is obtained by large tanks at each end of the boat, but it is intended to use these latter compartments as store-rooms, in which may always be kept a stock of provisions, spirits, clothes, medicines, water, &c., the whole supply being protected from damage by either rain or sea water. On each side of the belt of cork outside the boat there are numerous life-lines, which will hang in the water, so that anyone falling overboard on leaving a vessel may readily gain the boat and hoist themselves on board. In addition to this, there are lashed along what is intended to be the upper side of the boat as it stands on the vessel's deck, 12 cork life-buoys, six on each side, and should the boat in launching fall the other side up the life-buoys will disengage themselves and come to the surface, being equally available as they would have been had the boat not turned over. Captain Burkinshaw estimates that a boat of this kind, 30 feet long, will save at least 120 persons, either inside of her or standing upon the cork belt. It is intended that it shall be kept on deck, or on a hatchway even, and that a tram line shall be

placed from the boat's berth to the nearest gangway, by which means the boat can be launched without fear of any accidents with tackle falls, which in the hurry of leaving a sinking ship have so often been attended with fatal consequences.

The following composition, which is said

TO PRESERVE IRON FROM RUST.

is the invention of M. L. Machabee. It is also applicable to other materials, such as stone or wood, used in conjunction with iron or other metal, in the formation of reservoirs or other works: Virgin wax, 100 parts; Galipoli, 125; Norwegian pitch, 200; grease, 100; bitumen of Judea, 100; gutta-percha, 235; red lead, 120; and white lead, 20 parts; all of which, says the inventor, have their special value. The materials are mixed in a boiler in the order in which they are given, the gutta-percha being cut up in small pieces, or rasped. The mixture must be well stirred at each addition, and when homogeneous is poured into molds, and looks like chocolate. When used for preserving iron from rust, it is melted and laid on with a brush; but for stopping holes, &c., it must be in a pasty state. It may also be used as a glue to fix a piece of metal over a hole. For certain purposes, such as stopping holes in large vertical metal surfaces, the composition is slightly varied, the Galipoli being reduced to 115, the bitumen to 90, and the red lead to 100, while 40 parts of gum copal are added next to the gutta-percha.

M. Lostal, railway contractor, of Ferny, has communicated to the Society of Mineral Industry at St. Etienne the results of his observations on the effect of

LIME IN PRESERVING WOOD.

and his method of applying it. He piles the planks in a tank, and puts over all a layer of quicklime which is gradually slacked with water. Timber for mines requires about a week to become thoroughly impregnated, and other wood more or less time, according to its thickness. The wood acquires remarkable consistency and hardness, and, it is said, will never rot. Wood has been prepared in this manner for several mines, so that the plan will shortly be tested on a considerable scale. Beechwood has been prepared in this way for hammers and other tools for several ironworks, and it is said to become as hard as oak without losing its elasticity or toughness, and to last much longer than when unprepared. It has long been known that wood set in lime or mortar is preserved from decay, but no systematic plan for its preservation has until now been attempted.

Considerable interest has been recently excited in England by

NEW DISCOVERIES OF COAL.

at a point not many yards on the Birmingham side of the Wednesbury railway station, near the workings which have occasioned the interposition of the Board of Trade, where was lately a pond attached to the mill and also a croquet ground. It has been found to be an interesting section of the famous ten yard seam. The practical work of the Mines Drainage Commissioners having drained the mill pond, its bed was found to be thick coal, of which two yards had been worn away by having at a very early age thrust itself considerably above what is now the surface. Denudation and the recent overlying water have materially deteriorated the coal, which can be sold only as slack at 7/ per ton. The owner of the property (Mr. Hatton), is now sinking a shaft down to what he trusts may be marketable coal. It is not to be assumed that the cropping out of the ten yard seam is an unusual occurrence in South Staffordshire. On the contrary, the coal now and again appears, demonstrating the volcanic action to which this coal field has from time to time been subjected.

The interposition of the Board of Trade, mentioned in the above paragraph, was brought about by the

UNDERMINING OF A RAILWAY

In working this seam of coal. A parliamentary paper has been issued, containing the official correspondence and reports upon the undermining of the Great Western line near Wednesbury. In the report to the Board of Trade, Col. Hutchinson and Mr. Baker say the working of a coal seam of such magnitude, and lying so near the surface of the ground, under a railway used for passenger traffic, is, in our opinion, of so dangerous a character that we fail to see how any precaution the company may adopt could adequately meet the risk to which the public would be exposed in traveling over this portion of the Great Western Railway. This report was sent to the home office, and letters have been addressed by the Secretary of the Board of Trade to the owner of the mine and to the Great Western Railway Company, to the effect "that the Board of Trade feel it their duty at once to take advice as to the steps which they can take to stop the working of the mine and the running of the trains, in case they do not learn by return of post, that some arrangements have been made between the Great Western Railway Company and the owner of the mine to prevent the danger."

The surveys for the

IMPROVEMENT OF THE TIBER.

as proposed by General Garibaldi, have just been completed by the government engineers, and show clearly the great difficulties, in a financial point of view, which would have to be encountered in carrying out such a project, whether on the right bank or on the left. The deviation on the left bank—which would be the most favorable—would not cost less than 135,000,000 francs, or £5,400,000; whilst that on the right, which would entail a certain length of cutting from 70 to 80 meters in depth, is estimated at 200,000,000 of francs, or £8,000,000 sterling. In our opinion the most feasible scheme so far is that presented some time ago by a well known engineer, Signor Anderloni, who proposed rectifying the river in its course

through the city, giving it a clear water-way of 100 meters, and removing all obstacles—such as the Ponte San' Angelo—which in heavy floods dam back the waters, and cause them to overflow the banks and inundate the city. In the flood of 1870 the water stood at 1.30 meters above the soffit of the arches of that bridge. Such a work, including a handsome boulevard on each side of the river, with earth embankments for a considerable distance above and below the city, would not probably cost more than 50,000,000 of francs, or £2,000,000 sterling, and would, no doubt, effectually prevent the recurrence of such floods as that of 1870, when, according to Signor Possenti, the president of the Commission for the Tiber, the discharge at Rome reached 2800 cubic meters per second. The removal of the obstacles and the rectification of the river would produce a lowering of the levels of the water in such a flood as that of 1870 of 3.22 meters at Ponte Molle, about four kilos. above Rome; of 4.02 meters at Ripetta, where the river enters the city; 1.78 meters at Ripa Grande, where it leaves Rome; and 1.18 meters at the railway bridge, about 1½ kilos. lower still, or 6 kilos. below Ripetta. In this manner the flood level would be reduced at the Ripetta from 17.20 meters above the sea to 13.36 meters, or within the limits of safety. It would be necessary to construct intercepting sewers along the embankment to carry the drainage of the town some distance down the river, and in this manner there would be no danger of those parts of the city which are only 12 meters above the sea being flooded.

Italy, it seems, has invented a new artificial fuel, largely composed of

OLIVE KERNELS.

which consists of an admixture of 75 per cent. of olive kernels, after the oil has been extracted, with 25 per cent. of peat, lignite, and other substances found in abundance in Italy and the South of France. The consumption, to produce a certain amount of heat, is stated to be somewhat less than coal, which costs from 47 1/2 to 55 1/2 per ton in Italy, while the cost price of this fuel is about 30 1/2 per ton.

The following table gives some interesting figures in regard to the

RAILWAY MILEAGE OF THE PRINCIPAL COUNTRIES

OF THE WORLD:	Railroad Miles.	Population.	Area of square miles.
United States.....	71,568	40,232,000	2,492,316
Germany.....	12,207	40,111,265	312,091
Austria.....	5,865	35,945,592	227,254
France.....	19,333	36,469,875	201,500
Russia in Europe.....	7,044	17,207,794	1,992,574
Great Britain in 1874.....	15,814	31,817,108	120,769
Belgium.....	1,301	4,859,094	11,412
Netherlands.....	886	3,598,055	13,464
Switzerland.....	820	2,669,095	15,231
Italy.....	3,067	26,573,776	107,961
Denmark.....	430	1,741,741	14,353
Spain.....	3,401	16,301,850	182,758
Portugal.....	453	3,987,887	36,510
Sweden and Norway.....	1,040	8,960,122	188,771
Greece.....	100	1,532,588	19,941

From this table it appears, that the railroad mileage of the United States is equal to that of all the chief nations of Europe put together!

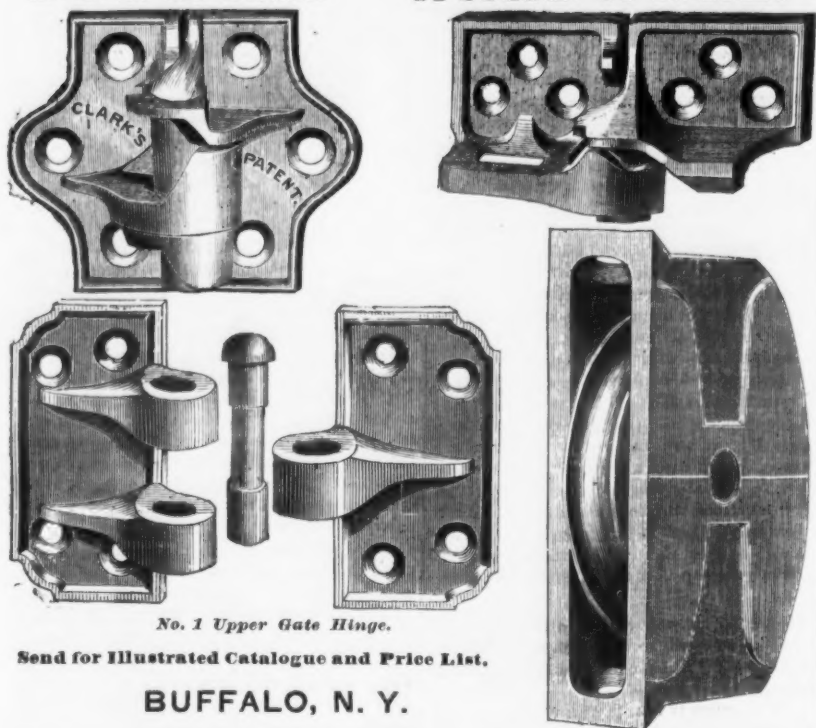
THE CONDITION OF

LONDON'S HEALTH. is well illustrated in the Registrar-General's annual summary for the metropolis. It shows an excess of births over deaths in 1874 of nearly 45,000. This improvement in the value of life in London has gone on now for some years, and is, no doubt, the first fruits of the sanitary reforms in drainage and other matters that have been for some time in operation. The mortality from bronchitis and similar affections was exceptionally large in 1874, and will probably be found still greater in proportion when the tables of the current year have been compiled. A curious example of the regularity with which accidents recur is shown by the returns of street casualties. The deaths by horse conveyances remain steadily the same, the number of persons being 211; vans or wagons still killing by far the greatest number—more than a fourth of the whole. This is the more notable as the vans are by no means the most numerous of all the vehicles on the streets; but they are not nearly so skillfully driven as the much more frequent cab, and from their great momentum and want of adequate brakes are less under the control of their drivers. Probably compelling the use of a proper brake would greatly diminish this class of accidents. The total number of cases of injury in the streets of London reported by the police in 1874 was 2053, not an extraordinary number when the crowded nature of those streets is considered, and it is remembered that the population of London in that year was at least three millions and a half.

THE SUPPLY OF TIMBER

for constructive purposes has been already shown to be diminishing, not only in Europe but in the United States of America, to a degree which it would be no exaggeration to describe as alarming. The forests of South America, however, have lost little, comparatively speaking, of their original dimensions, especially in the tropical regions, where the recuperative powers of nature are at the highest. Brazil abounds everywhere in timber of the finest quality for building; from this source come also some of our most useful dye woods, while the richest and finest wood for cabinet work grows there. Still, even in Brazil, timber is becoming scarce along the coast, and any farther development of the trade must depend on the opening up of the interior by means of railways and improved navigation of the rivers. Where there have been cuttings for exportation and the land has been much cleared we find a similar deterioration of climate to that noticed under the same circumstances in Europe. There is observed in such cases a decrease of the rainfall and an increase in the heat; as at Rio Janeiro, where, before the destruction of forest in the vicinity, the climate was very good and healthy. Formerly in the three hot months after December frequent rains cooled the air, making it fresh, light and transparent. The climate was thus rendered pleasant and the tropical heats supportable, while yellow fever and other epidemics were unknown. That favorable state of things no longer exists; those of the inhabitants who can afford it now retire inland during these months; "yellow jack" has become an institution, and the streams and springs have dried up to such a degree that the government has been obliged to bring water from the mountains a long way off and at considerable expense. In other places along the Brazilian coast, as well as at Rio, the same sinister influence is noticed wherever the woodlands have been laid bare.

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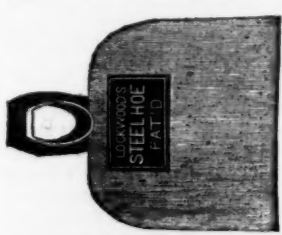
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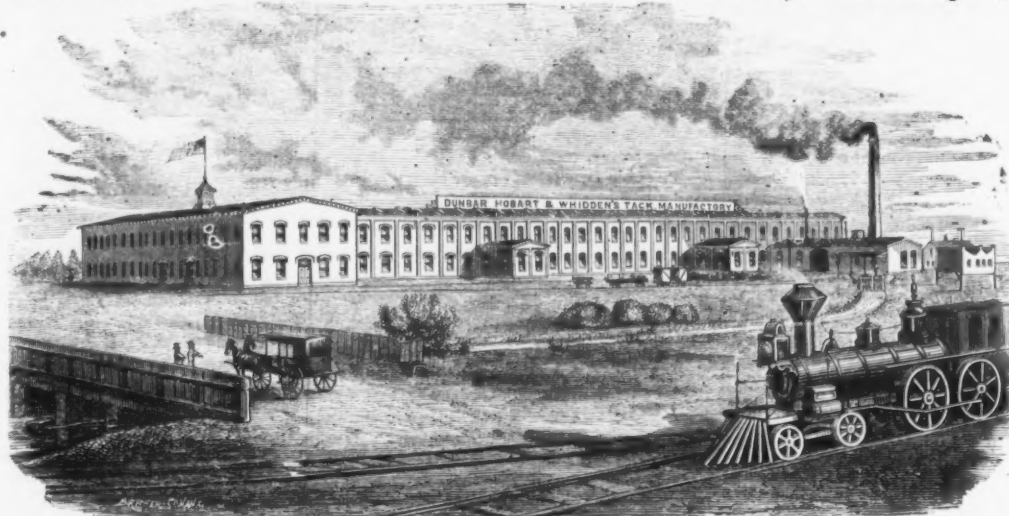
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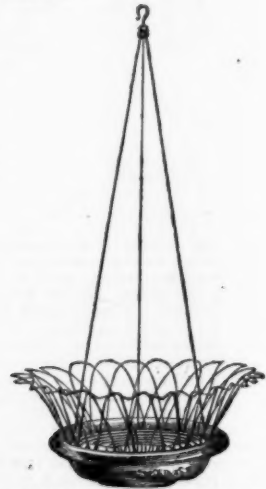


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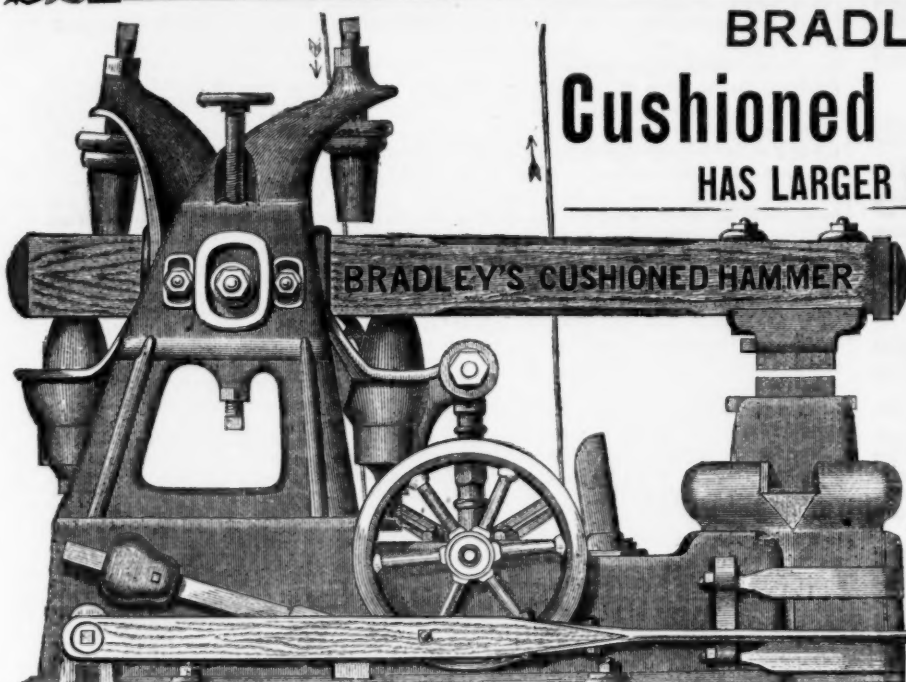
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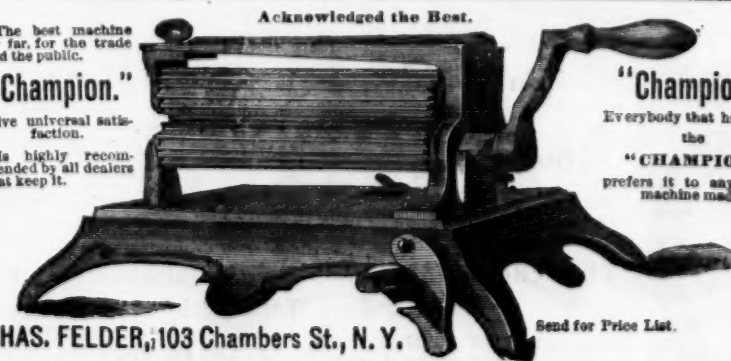
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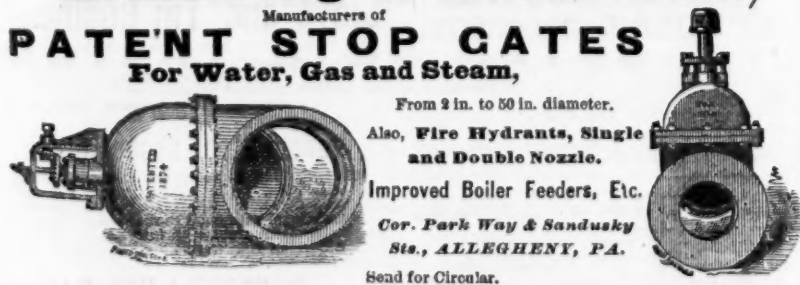
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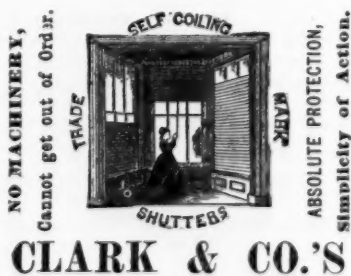


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Chicago Office, 54 La Salle Street.

Liability of "Consolidated" Companies for Obligations of the Old Ones.

The facts in the recent case of Prouty vs. The Lake Shore Railway Company (53 N. Y. 363), will sufficiently appear in the following opinion:

In so far as the property formerly of the Michigan Southern and Northern Indiana Railroad Company is concerned, the present consolidated company is the successor of the former company; but in respect to the properties of the other companies, which have joined in the consolidation, it is a new and independent company, as to the creditors of the old Michigan Southern and Northern Indiana Railroad Company, and they have no claim upon such new company under their original contracts, but only by virtue of the assumption by the new company of the obligations of the several corporations which united in the consolidation. So of the individual defendants. In so far as the trust devolves upon them of managing the property formerly of the old company, they occupy, in relation to the plaintiff, the position of successors to the individual defendants named in the complaint, and are bound by all proceedings had against their predecessors. But as to the other properties which have come under their charge, they are successors to officers of other companies against whom the plaintiff had no right of action upon his original contract. Therefore both as to the corporation defendant, and the individual defendants brought by the order of substitution, if the only effect of the substitution was to continue against them proceedings which affected the property of the original defendants, the case would be simply one of the substitution of new parties representing the same interests as the original defendants, and this might properly be done by motion within one year (code § 121).

But the effect of the substitution in the present case is much more extensive. It not only continues the proceedings against the successors of the original defendants, but against a corporation, and the treasurer and directors thereof, having control of and being vested with the property formerly of two other companies, not originally liable upon the contract by virtue of which the plaintiff claims; and subjects the property of those two companies to a decision rendered subsequently to the consolidation in an action to which they were not parties.

In the action as originally brought, the defendant being a foreign corporation, a judgment could only be enforced against such of the property of the defendant as could be found within the State, and by personal remedies against such of the officers as resided within this State, or were here found and served with process in the action. By the decision of the referee, the directors and treasurer of the original corporation defendant were not only required to pay the amount found due to the plaintiff for back dividends, but were also restrained from making any disposition of the funds, effects of property of the corporation defendant, or any part thereof, and from declaring or paying any dividends on its common stock, until the claims of the plaintiff and all other holders of the guaranteed stock described in the complaint should be satisfied in full. The substitution of the present consolidated company and its officers as defendants in place of the old Michigan Southern Company, and its officers, the original defendants, makes all these provisions obligatory upon the substituted defendants, and subjects them, and all the funds and property of the consolidated company, to the restraint adjudged against the old Michigan Southern Company.

It may be said that the obligations which the consolidated company has assumed render it just that such a judgment should ultimately be rendered against it. But however clearly it may appear that the plaintiff and those in whose behalf the action purports to be brought are entitled to such a remedy, it can legally be obtained only in an action against the parties affected, founded upon their assumption of the liabilities of others, and not by the summary process of a motion to insert their name as defendants, and thus to apply to them an adjudication previously made against the original debtors.

What Cheap Electricity is Expected to do.—The recent improvements in magneto-electric apparatus, in which, as is well known, all expensive batteries are discarded, being driven by steam-power alone, at an expense of

5 cents per horse-power per day, have given such encouraging results that it is anticipated that by further perfection powerful electric currents may be produced cheap enough to perform the operations of manufacturing chemistry, thus far performed by batteries, the hydro-oxygen blow-pipe, by furnaces, or expensive chemical reaction, as acids, alkalies, etc. An inventor in London (not named in the report from which we borrow the following details) after having perfected a machine of the kind mentioned, driven by 2½ horse-power, and equivalent to 500 Bunsen cells, but costing only from 12 to 15 cents per day to run it, is now making another one equal to 1000 such cells, by which he proposes to produce chemically pure copper, which is now worth from 3 to 4 a pound at the cost of ordinary commercial copper; potassium and sodium at less than half their present price; aluminum, now at 75 per pound, at 30 or 35; and magnesium, calcium, and other rare metals at prices which will bring them into commercial use. The inventor of this machine has even the courage to declare that he will purify two tons of pig-iron from phosphorus, sulphur, carbon, and silica in eighteen or twenty minutes, at a saving of two-thirds of the cost. This latter point may be very doubtful, but every thing certainly tends to the probability of a glorious triumph in store for practical electrical science.

Comparative Cost of English and American Bessemer Steel.

A London correspondent of the Philadelphia Evening Telegraph says: It will be understood in a moment by readers of this letter, that a progressive increase in prices both of iron and of the mechanical skill necessary to puddle and convert it directly into useful forms, brings the English market so near the rates of the Pennsylvania, that you will need no prohibitive tariff to ensure that production shall be confined mainly to your own works. I learn on the highest authority in this country, that comparing accommodation of all kinds with accommodation in iron ships, a first-class vessel now costs exactly twice the sum that would have been required 10 years ago, and in 10 or 15 years more another advance of equal amount will have been made. A great social revolution is producing vast changes in our chief branches of industrial supremacy, so that now France, Sweden and Russia can build and equip sea-going vessels as cheaply and as well as the best of our great private yards on the Thames and the Mersey, the Humber and the Tyne. The United States are admitted to be yet a little in the rear, but the interval grows perceptibly and sensibly less every day. The second point is the change which is imminent in the materials of construction.

Bessemer steel, now largely worked up for various purposes in Pennsylvania, is being employed for the armoring of three first class war vessels in the French admiralty yards of Havre and L'Orient, and the adoption of steel, which has qualities that place it incomparably above iron, is mooted in the English yards. The principal difficulty in the way of its extensive use is that presented by the need for immediate, highly skilled supervision at every stage. To be dealt with fairly and with an approximate certainty of definite results, Bessemer steel plates must be annealed after punching, or the steel becomes for every purpose inferior to common iron. To insure this being done, an army of competent overlookers, highly paid, must be had, and this necessity, together with the fact that Bessemer steel is not so absolutely perfect when treated with the greatest care, points to an enormous increase in the cost of production of a large ship. It was quite illusory for Mr. Bessemer to rise at one of the meetings of the naval architects to urge the perfection every way of the splendid material which steel has, under his care, become. The reply was not abstract in its nature, but concrete. Mr. Barnaby produced a steel plate struck on both sides to bend in opposite directions. The curvature was perfect in one instance, in the other there was a huge crack. A murmur of conviction that no argument could reverse ran through the crowded hall of the Society of Arts, where the Congress took place, on the exhibition of this proof of the applicability of the words "uncertain, and to some extent treacherous," to Bessemer steel.

Messrs. Hussey, Dravo & Co., of Pittsburgh, have leased the vacant lot at the south end of the Monongahela bridge, where they propose to erect a building and carry on the manufacture of steel castings.

Effect of Impurities in Copper.

Dr. Hampe has made some experiments for the purpose of determining the influence of foreign substances upon metallic copper. The following are some of his results, which differ essentially from what had been expected.

Suboxide of Copper.—The presence of 0.05 per cent. of oxygen, which corresponds to 0.45 per cent. of suboxide, does not cause any perceptible decrease of ductility of copper, but renders it much less tenacious; 0.1 per cent. of oxygen, equal to 0.9 per cent. of suboxide, has little effect in the cold and none at all when hot; 0.25 per cent. oxygen, equal to 2.25 per cent. suboxide, causes a perceptible decrease of ductility when cold, but it is always about equal to that of ordinary refined cast copper, so that it can be used for all purposes. Short-hot is not caused by this quantity, but takes place when 0.75 of oxygen, equal to 6.7 per cent. of suboxide, is present. In general, the suboxide has the effect of making copper cold-short rather than hot-short, while Karsten gives just the opposite opinion.

Sulphur, as sub-sulphide (not present as such in the refined metal), renders copper cold-short. The presence of 0.05 per cent. of sulphur renders the copper more ductile than ordinary refined copper; even with 0.25 per cent. of sulphur the copper is quite ductile, but with 0.5 per cent. of sulphur it is very short when cold, but not when hot, and very soft.

Arsenic and Arsenic Salts.—Arsenate of copper acts upon chemically pure copper like a foreign body, which mechanically loosens the composition of the molecule. With small quantities there is merely a decrease of tenacity; with larger quantities it becomes very cold-short, and finally, hot-short, too. The presence of 0.4 per cent., which corresponds to 0.1 per cent. arsenic and 0.08 per cent. oxygen, imparts to the copper the qualities of excellent refined copper; 2 per cent., or 0.55 per cent. of arsenic, makes it very cold-short and hard, also some what hot-short and unfit for use. After the reduction of the sub-arsenate of copper, the metal is essentially improved in quality, and is more tenacious. Hot-short does not take place with 0.5 per cent. arsenic, appearing first with 1 per cent., but then it is no longer cold-short—quite different from the previously received theory of the effect of arsenic.

The suboxide of copper is more sensitive to arsenic acid than to antimonious acid, but an equal quantity of metallic antimony produces just as tenacious and ductile alloys as arsenic, and the limit for red-short is lower for antimony than for arsenic.

Lead.—The presence of 0.15 per cent. of lead in otherwise pure copper does not injure it, but rather renders it very ductile, without being hot-short; with 0.3 per cent. it becomes slightly hot-short, when rolled out very thin; with 0.4 per cent. and upward it is strongly hot-short and distinctly cold-short. The copper may be rolled out well enough, but is rotten, and breaks or scales when bent. If the quantity of lead exceeds a certain limit, the different alloys separate. This takes place in a marked degree in the presence of 1 per cent. of lead.

Bismuth, even in extremely small quantities, exerts a deleterious influence on the ductility, which is greater when hot than cold. With 0.05 per cent. of bismuth the copper is perceptibly cold-short and very hot-short; with 0.1 per cent. it is cold short, and at a bright red heat it crumbles. The simultaneous presence of antimony, along with the bismuth, considerably diminishes the injurious influence of the bismuth.

Over-toughened Copper.—When the operation of rolling, which is employed for the purpose of toughening the copper, has been carried too far, it is sometimes hot-short and sometimes not. It is hot-short if it contains antimonite or arsenite of lead or bismuth, which are reduced by over rolling, while copper free from such salts is full of bubbles and imperfect when hammered out, but not hot-short.

If the influences above mentioned of foreign admixtures upon the properties of copper be used as guide for judging of the quality a given specimen of copper from its composition, as established by analysis, it will be found that the actual ductility is always considerably less, at least for ordinary temperatures, than its constitution would indicate. In judging of the quality of copper the specific gravity, as well as the chemical composition, must be taken into consideration more than has heretofore been done, for it stands in close relation to its strength.

Coke from Anthracite Coal.

W. Penrose and W. F. Richards, of Swansea, Wales, have received a patent for an invention relating to the production of coke. It consists in the mixing or incorporating of anthracite or stone coal, or free burning steam coal, or coal known as Staffordshire slack, or other non-coking coals, with bituminous coal, or any other coal capable of making coke, with pitch or tar, or with any form of tar or bitumen, mineral oils containing bitumen, petroleum, such coal or coals being in a state of division. The mixture thus produced is to be placed in any well known form of oven or retort commonly used for coking, and the surface is then to be covered with a layer of bituminous coal or other bituminous matter. In carrying out this invention the inventors cause the coals to be disintegrated, or ground, by any well known disintegrator, such for example, as that known as "Carr's disintegrator," and to each disintegrated coal or mixture of the same—by preference in a moist condition—they add one or more of the above named ingredients, viz., pitch, tar, or any form of tar, bitumen, or mineral oils containing bitumen, petroleum, or

any of the waste products of petroleum, and they cause the same to be thoroughly mixed. When such mixture or incorporation has been effected, either by means of a disintegrator or pug-mill, or other incorporating apparatus, the minerals thus mixed are to be introduced into a convenient retort or any of the well known forms of coking ovens for the purpose of being converted into coke, and when placed in such oven or retort are to be covered with a layer of bituminous coal or matter, bituminous coal being preferred. The proportions in which the coals or mixtures of the same are to be employed, together with one or more of the before mentioned materials, will vary according to the quality of the coal or coals and the nature of the bituminous matter employed. They have found that good results may be obtained by employing from about sixty parts by weight of anthracite or stone coal of average good quality to about thirty-four parts by weight of bituminous or coking coal, and to about six parts by weight of pitch or ordinary coal tar. The layer of bituminous coal employed may vary from about 4 in. to 6 in. in depth, but, as we have before mentioned, these proportions and layers may be varied. This invention may be of especial interest to the owners of anthracite blast furnaces.

An interesting resume of the leading facts in early railway history will be found in the following extract from the late address of Thomas Allen, president of a Missouri railway, at St. Louis, viz: One of the most remarkable things about this wonderful railway system is that its beginning is within the memory of those now in the prime of life. Whoever is curious upon the history of it should read Smiles' story of the Life of George Stephenson. Whoever would see the first locomotives, will find the French example in the *Conservatoire des Arts et Metiers* in Paris, and the English one still preserved in Kensington Museum, in London. It was only forty-five years ago that the first locomotive, drawing a train of cars, at a speed exceeding ten miles an hour, appeared upon the Liverpool and Manchester Railway line, in England. George Stephenson had worked upon it for fifteen years to bring it up to the imperfect state in which it appeared. Tramways had existed from time immemorial, and they established the gauge of four feet eight and one-half inches, now the standard of American railways, which was simply the gauge of the ordinary road wagons, to which they were originally adapted. They were used at Quincy, in Massachusetts, in 1826, and at Mauch Chunk, in Pennsylvania, in 1827. But the first important line of railway was undertaken in this country by the Baltimore and Ohio, and opened fourteen miles, in 1828, and operated by horse-power. It is a disputed question, whether it was the first American locomotive, which appeared on this road, in 1830, built by Peter Cooper, New York, and ran from Baltimore to Ellicott's Mills, or whether it was a locomotive built by Governor Morris, of the West Point Works, which made its appearance on the Charleston and Hamburg Railroad of South Carolina. In 1833 this latter road was 136 miles long, and at that time the longest railway in the world. There is another question of some doubt, whether the first English locomotive in America, built by George Stephenson, appeared on the Baltimore and Ohio Railroad, or whether it was a little English locomotive, weighing six tons, which drew a train load of passengers on the Mohawk and Hudson Railroad, from Albany to Schenectady, in 1831. These movements in the construction of railways in New York, Maryland, and North Carolina, were nearly simultaneous. A student, then in college, had the honor of witnessing the coming of this first train, as I then supposed, in America, into the astonished sight of the people of Schenectady, including all the students of Union college, in 1831. The locomotive was a very crude affair, and the cars were simply stage coaches, set on frames. These forms of coaches were an imitation of the English style, which is continued in England to the present day, and they were continued on the New York lines some ten or more years later.

The "Menominee Furnace" blew out on the last day of April, for the purpose of repairing their stack. They blew in for the first time May 1, 1874, and have lost eight days, giving them 357 working days, in which time they have manufactured 7316 gross tons of iron, making a daily average of over 20 tons; manufactured from soft wood coal; two-thirds of coal made from slabs from our mills, and an average of 136 bushels of coal to the ton has been used. No furnace in the land can probably show as fine a record in the economy and successfulness of the manufacture, or the superiority of the iron as practically tested. The fact that the demand has been equal to the supply establishes the reputation it has acquired at home and abroad, and speaks volumes for those who have had the direct supervision of its production. Work will be resumed as soon as repairs are made.

The above extract is from the Menominee (Michigan) Herald of the 6th inst. This furnace is 44 feet high with nine feet four inches bosh. The result is wonderful, considering the fuel used; before the furnace was built the pine slabs were burned up by the mill companies. The furnace is owned by A. B. Meeker & Co., of Chicago, and is located on the shore of Green Bay, and connected by tracks with the Chicago and Northwestern Railway.

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desirous of introducing their goods to the British and Continental Markets, are advised to insert advertisements in the newspaper "IRON," published every Saturday, at 99 Cannon Street, London, E. C.

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THE SIXTH
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Industrial
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Opens for the reception of goods August 2, 1875. Opens to the public September 5th, and continues open until October 9th.

16
GRAND
DEPARTMENTS,
and an extended premium list in medals and gold coin.

Machinery Tested and Fully Reported upon.

Send for rules and premium list, and blank applications for space.

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TENTH
Industrial
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UNDER THE AUSPICES OF THE

Mechanics' Institute,
OF SAN FRANCISCO.

Manufacturers, Mechanics, and others, are advised by the above Exhibition will be opened in San Francisco on the

17th day of August

next, and will continue open at least one month. The Board of Managers invite all who desire to exhibit, to send in their application for space without delay to Mr. J. H. CULVER, Secretary, 27 Post St., San Francisco, who will promptly answer all inquiries.

700,000 PERSONS

from all parts of the Pacific visited the Exhibition of 1874, to see what could be learned or purchased in San Francisco and the United States.

San Francisco, with its population of one quarter of one million, is in intimate relations with Japan, China, Australia, Mexico, Hawaiian Islands, British Columbia, the various islands of the Pacific and contiguous domestic territory.

There is no charge of exhibiting, and power for driving machinery, etc., is furnished free.

By order of the Board of Managers.

A. S. HALLIDIE, Pres.

Notice to Capitalists.

The Valuable Works and Property belonging to the Canadian Titanic Iron Company, Limited, at St. Urbain and Bay St. Paul,

Will be sold by the Sheriff on the 18th of May next.

The Furnace, Tramway, Wharf, Buildings, &c., has cost nearly \$80,000 sterling.

For particulars see the *Official Gazette* for the Province of Quebec, or apply to the undersigned.

E. H. DUVAL, Liquidator, C. T. I. Com. L'd.

April 16, 1875.

NOTICE.

We beg to inform the Hardware Trade that, as successors of the former agents of the Washoe Tool Mfg. Co., we hold the only stock of Washoe Picks in the market. If orders are addressed to us they will be filled promptly, as far as our stock permits, and at a liberal discount.

(Signed) HOGAN & CLARKE.

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Wanted.

A partner with \$12,000 to \$30,000, to extend an established paying manufacturing business in the South. This will bear strict examination. Best references given and required.

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Having established an Agency in Germany, we invite manufacturers to correspond with us regarding the introduction and sale of articles suitable for the European market. Address

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DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

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in quantities to order at reasonable rates.

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By an experienced man, a situation to superintend the Practical Department of a Rolling Mill. One who understands the getting up of fine grained iron, and all kinds of puddled iron for all purposes; also, Bessemer steel. Has had large experience in managing works in England. Is a practical iron worker. Refers to Mr. W. Gill, Managing Director Teesdale Iron Works, Middlesbrough, England; Mr. W. H. Brown, Blackhouse, Upper Thorpe, Sheffield, England. Address

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WANTED A Good Second-hand Roll Lathe that will suit to turn 8 and 12 in. Rolls. Send description and price. Address,

SHAEER, JOHNSON & CO.,

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TO LET,
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Having during the past 10 years constructed and put in operation a number of the most successful Charcoal Blast Furnaces in the country, and having a competent corps of workmen constantly in my employ, I am enabled to offer advantages in constructing or remodeling upon the latest and most approved plans.

Examinations of Furnace Property made and reported upon when solicited. Correspondence promptly attended to.

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Facings. Best Quality Ingot Brass.

Cash paid for all kinds of Metals and Tools.

Wanted.

A situation as Blast Furnace Manager by a young man who thoroughly understands the practical management of Blast Furnaces, and has had several years' experience in smelting Titanic, Hematite and various other ores. The best reference can be given to influential gentlemen in the iron trade in England.

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W.

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DEER RIVER, Conn., Sept. 7, 1874.

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Iron Screws, Revised Lists, 19 Discounts, 75c. each.

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Files, 3c. to 5c. to the 2c. list; 10c. each.

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Thirty thousand acres, abounding in the several varieties of Hematite and Magnetic ores, covered with timber; limestone abundant; contiguous to one of the largest Railroads leading east and west, low freights insured; coal within 30 miles of Works. Consists of Charcoal Furnace and Forge of 300 tons a month capacity; fine manager's house, large store, stables and workmen's houses, &c. Labor 75c. a day; cost of Charcoal, 1c. a bushel; iron ore, \$1.75 a ton; lime stone, 80c., all delivered at Furnace. Freight to Pittsburgh, \$3.50, Baltimore, \$2.40. Ores can be placed in Pittsburgh almost beyond competition. For sale, or will be operated jointly.

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1 Pair (Gould & Garrison) Vacuum Pumps, 16 inch air and 10 inch steam cylinders.
1 Steam Pump (Gould & Garrison), 12 inch water and 24 inch steam cylinders.
The above have been used six months, and will be sold very cheap.

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An 8 inch mill train for making Merchant, Band and op Iron. Will be sold cheap.

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The Carbon Stove Company,
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Will sell their Foundry, with all its appurtenances, business and good will, upon very liberal and accommodating terms, offering to any party wishing to engage in the Stove or general Foundry Business a rare opportunity.

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Trade Report.

Office of THE IRON AGE
WEDNESDAY EVENING, May 19, 1875.

During the week under review little has transpired to vary the monotony of almost unusual dullness. In general trade but little of profitable activity is reported, and owing to the restricted demand for it, money remains easy and abundant. Borrowers on call are accommodated at 2 @ 3 per cent., and the discount rate on prime commercial paper is 4 @ 5 per cent.

The gold market has been strong, partly on account of heavy shipments and partly because of a movement to organize another clique to lock up gold and disturb things generally. Foreign exchange declined to \$4.87 @ \$4.90 for prime bankers' sterling. The following shows the daily range of the premiums:

	Highest.	Lowest.
Thursday	115 1/2	115 1/2
Friday	116 1/2	115 1/2
Saturday	116 1/2	115 1/2
Sunday	116 1/2	115 1/2
Monday	116 1/2	115 1/2
Tuesday	116 1/2	115 1/2
Wednesday	116 1/2	115 1/2

Government bonds have been strong in sympathy with gold in this market, and steady in London. On Saturday the Secretary of the Treasury issued another call for \$5,000,000 of five-twenty, interest to cease August 1st, making \$35,000,000 in all the new notes taken by the Syndicate. There is a good investment demand for railway mortgages at advancing prices. We give below the closing quotations of governments.

The stock market has experienced a sudden decline, and speculative shares are generally regarded with disfavor by those who have capital to risk in Wall street operations. The principal dealings have been in Lake Shore, Pacific Mail, Erie, Western Union, Rock Island and Union Pacific. We give below the highest and lowest of to-day's quotations for active shares.

The bank statement shows an increase in all items except circulation, which has fallen \$124,400. The following is a comparison of the averages for the last two weeks:

	May 8.	May 15.	Difference.
Loans	\$283,420,800	\$285,216,901	Inc. \$1,796,100
Specie	10,100,000	10,364,500	Inc. 264,500
Leg. Tons	58,017,500	59,356,300	Inc. 1,338,800
Deposits	227,873,300	231,991,300	Inc. 4,040,000
Circulation	30,485,400	30,363,800	Dec. 121,600

The following tables show the foreign trade movements for the week:

	1873.	1874.	1875.
Total for week	\$7,938,923	\$7,523,569	\$4,550,392
Prev. reported	163,225,177	151,225,213	132,184,684

Since Jan. 1. \$171,163,440 \$158,750,082 \$136,735,046

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Amvils	41	318
Brass goods	3	634
Bismuth	2	1,841
Bronzes	9	369
Chains and anchors	30	175
Copper	55	18,715
Cutlery	45	5,925
Guns	21	4,445
Hardware	31	10,664
Iron, pig, tons	2,856	1,008
Iron, cotton ties	151	11,774
Iron, other, tons	241	21,369
Metal goods	11	6,709
Needles	1	224
Platina	10	3,066
Per. caps	1	117
Saddlery	3,015	32,219
Steel	4	173
Silverware	10,168	73,411
Tin, boxes	135,326	38,278
Tin, 1008 slabs	273	3,418
Wire		

EXPORTS, EXCLUSIVE OF SPECIE.

	1873.	1874.	1875.
For the week	\$5,482,894	\$6,604,654	\$4,106,551
Prev. reported	100,640,538	100,700,304	78,141,965

Since Jan. 1. \$106,123,433 \$107,304,558 \$89,257,516

EXPORTS OF SPECIE.

	1873.	1874.	1875.
Total for week	\$2,223,115	\$2,532,584	\$2,796,699
Same time in 1874	16,026,682	16,026,682	16,026,682
Same time in 1873	19,138,897		

Government bonds at the close were strong, with quotations as follows:

	Bid.	Asked.
U. S. Currency 6's	104 1/2	104 1/2
U. S. 6's 1881, reg.	104 1/2	104 1/2
U. S. 6's 1881, cou.	104 1/2	104 1/2
U. S. 5-20 reg.	117 1/2	117 1/2
U. S. 5-20 1882, cou.	117 1/2	117 1/2
U. S. 5-20 1884, reg.	117 1/2	117 1/2
U. S. 5-20 1884, cou.	117 1/2	117 1/2
U. S. 5-20 1885, reg.	117 1/2	117 1/2
U. S. 5-20 1885, cou.	117 1/2	117 1/2
U. S. 5-20 1886, reg. new	122 1/2	122 1/2
U. S. 5-20 1886, reg.	122 1/2	122 1/2
U. S. 5-20 1887, reg.	122 1/2	122 1/2
U. S. 5-20 1887, cou.	122 1/2	122 1/2
U. S. 5-20 1888, reg.	122 1/2	122 1/2
U. S. 5-20 1888, cou.	122 1/2	122 1/2
U. S. 10-40 reg.	116 1/2	116 1/2
U. S. 10-40 cou.	116 1/2	116 1/2
U. S. 6's 1881, reg.	116 1/2	116 1/2
U. S. 6's 1881, cou.	116 1/2	116 1/2

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consol.	105 1/2	104 1/2
Lake Shore	65 1/2	65 1/2
Rock Island	102 1/2	102 1/2
New Jersey Central	110 1/2	110 1/2
Cleveland & Pittsburgh	67 1/2	67 1/2
Western Union Telegraph	77 1/2	76 1/2
Atlantic & Pacific Telegraph	35 1/2	34 1/2
Northwestern	30 1/2	29 1/2
Milwaukee & St. Paul	36 1/2	35 1/2
Panama	143	141
Pacific Mail	37 1/2	37 1/2
Erie	26 1/2	25 1/2
Ohio & Mississippi	25 1/2	24 1/2
Union Pacific	76 1/2	75 1/2
Missouri Pacific	51 1/2	50 1/2
Atlantic & Pacific	15 1/2	14 1/2
C. & Ind. Cen.	5 1/2	5

GENERAL HARDWARE.

Trade in General Hardware is not as active as it was a week ago. In the matter of prices there are no changes of importance to note.

The demand for Foreign Hardware shows no sign of improvement, and quotations of leading goods continue without change.

There is nothing new to report regarding the Nail market. The stocks in this city are in many instances broken, but the demand is not sufficient to allow this circumstance to have an enhancing influence as regards price. We continue to quote 10d., in lots of 200 kegs and

over, at \$8.25, net, with no disposition on the part of holders to shade this figure for a large order. Small lots are quoted at \$8.35 @ \$8.40. Trade in House Furnishing Goods, Tinners' Trimmings, &c., presents no new feature. The combination prices agreed upon by the manufacturers of Stamped and Re-tinned goods are, we are informed, adhered to, and we hear of no cutting in prices. The demand has fallen off during the past week.

The Stanley Rule and Level Company have introduced a new and greatly improved feature into Bailey's Patent Block Plane No. 9 1/2, as will be seen by reference to the engraving in their advertisement on page 26 of this paper. The Plane Iron is moved by means of a thumb screw, which admits of a nice adjustment than with a lever, as formerly used; and the eccentric movement given by a lever, which has a tendency to slide the iron to one side, is dispensed with entirely. Plane No. 9 1/2 is also adjusted in the same manner now; and the handle being secured to the stock by a nut, it can readily be removed or replaced at the convenience of the owner.

J. Clark, Wilson & Co. continue to act as New York agents for D. H. Whittemore, manufacturer of Coring, Paring and Slicing Machines, and all orders received from territory which can properly go to New York, will be executed by them. Prices for the coming season will be as follows, viz.:

"Bay State" Coring, Paring and Slicing Machine, per doz.	\$15.00
Less than 5 doz.	dis. 10%
10 doz.	dis. 15%
25 doz.	dis. 25%
"Bay State" Coring, Paring and Slicing Machine, per doz.	\$8.00
Less than 10 dozen	dis. 10%
10 doz.	dis. 15%
25 doz.	dis. 25%
"Bay State" Peach Parer, per doz.	\$12.00
Less than 5 doz.	dis. 10%
10 doz.	dis. 15%
25 doz.	dis. 25%
"Peach Stoner and Halver," per doz.	\$10.00
Less than 5 dozen	dis. 10%
5 doz., discount	10%
Union Improved Apple Parer, with Table and Push Off, per doz.	\$7.75

The manufacturer says: "The 'Skeleton' Corer, Parer and Slicer has been greatly improved in the manner of holding and setting the slicer knife. This makes it a perfect and easy working machine, while doing three times the work of any other machine, save the 'Bay State.' Its cost is but a trifle over the ordinary Parer."

Van Wagener & Williams, No. 82 Beekman street, issue a new catalogue of Door Springs made by them, which embraces many favorably known in the market, viz: The Gem Coil Spring, the old style Rod Spring known to the trade for many years as "Torreys," and Gray's Improved Rod Springs, Nos. 1 and 2. This firm have recently moved to their present location, where they have a fine office and salesroom, and superior manufacturing facilities, all in the same building. They make a specialty of Door Springs and Spring Hinges, and are the manufacturers of the well and favorably known "American Spiral Spring Butts." The Door Spring market has hitherto been supplied by several manufacturers, but the downward tendency of prices that has prevailed during the past few years has had the effect usual in such cases, of concentrating the business, and Van Wagener & Williams are the first to supply a full line of the most approved Springs. They guarantee all their Springs, in the manufacture of which, we are informed, they use nothing but the very best materials. They also manufacture, at their establishment in Beekman street, the "Domestic" Blind Adjusters, Gray's Adjustable Bench Clamps, Gray's Ratchet Bed Keys, and other articles for the Hardware trade.

G. Webster Peck, No. 110 Chambers street, has issued the following list of Croquet for the season of 1875, manufactured by the American Croquet Co., for whom he is agent. These goods are well finished, and the assortment is very complete. He is prepared to fill orders from stock. The regular discount from the list is 10 @ 15 per cent.:

DESCRIPTIVE PRICE LIST OF THE AMERICAN CROQUET COMPANY.

The attention of the trade is called to the following facts in reference to this Croquet. The Lumber is all most thoroughly seasoned, having been prepared nearly 18 months. The Balls are made of selected Hard Maple, and being turned in a new patent machine, are regular spheres. The company holds an exclusive right to the use of several patents, which enables them to turn out a uniform Ball, Handle and Mallet, which is quite indispensable to scientific playing. They have adopted a new manner of crumbing, which for simplicity and security cannot be surpassed. No Nails are driven into the boxes.

No. 6, Hard Maple—Four barrel shaped mallets; four balls; Linden Wood handle, plain, unadorned arches. Put up in heavy Manila bag, each set separate, and 25 sets in a box. \$1.00
No. 6, Hard Maple Set—Eight mallets and balls, neatly painted, with some slight defects; maple or Lindenwood handles; two stakes; arches, book, etc. Complete in dovetailed box. \$2.00
No. 1, Hard Maple Set—Eight concave-shaped mallets; eight maple balls; white ash and maple handles; stakes, arches and book; painted and varnished. Complete in dovetailed box, and warranted perfect. \$2.30
No. 3, Hard Maple Set—Eight concave-shaped mallets; eight selected maple balls; white ash or maple handles; painted with oil and varnish finish; stakes, arches, etc. Complete in dovetailed case—a very desirable set. \$2.25
No. 3, Selected Hard Maple Set—Eight fancy turned concave-shaped mallets; eight selected maple balls; maple or white ash handles; painted with oil and varnish finish; stakes, arches, etc. Complete in dovetailed case. \$2.75
No. 4, Selected Hard Maple Set—Eight fancy turned convex mallets; eight selected maple balls; maple or white ash handles; painted with oil and varnish finish; fancy painted stakes both eight colors; arches, etc. Complete in selected dovetailed case. \$3.00
No. 5, Selected Hard Maple Set—Eight fancy mallets of richly grained hickory, beautifully painted; eight choice rick maple balls, double striped; stakes both painted eight colors; a very handsomely painted and highly finished set; heavy arches; complete in selected dovetailed case. \$3.00
No. 6, Apple Wood Set—Eight fancy turned apple wood mallets; eight choice selected maple balls, double striped; fancy stakes, heavy arches; handsomely painted and finished; complete dovetailed case with bronze trimmings. \$3.25
No. 7, Apple Wood Set—Eight design mallets, club shape, of apple wood, six inches long; eight choice selected maple balls, double striped; extra large fancy stakes; heavy

arches; handsomely painted and finished; complete in large black walnut case, lined; the finest set made of American wood. \$3.50
Order sample crate. Packed five sets in each crate.

The Stanley Works, New Britain, Conn., and 79 Chambers street, New York, issued the following revised discount sheet under date of 7th inst. The advance in the price of Wrought Butts we noticed last week:

Circular No. 75, May 7th, 1875.

Advances and discounts on price list of October, 1870, and supplement of February 5, 1874. Terms, net cash, 30 days. Payable in New York current funds, freight as heretofore. Prices subject to changes of the market without notice.

Catalogue pages.	Discount per cent.
4 and 5, Bronzed Capped Butts	45
Suppl. Bronzed Loose Joint Butts with Acorns	10
Suppl. Bronzed Loose Joint Butts, no Acorns	15
8 to 12, Bronzed Narrow Butts	15
8, Bronzed Light Narrow Butts	15
11, Bronzed Light Inside Blind Butts	15
6 and 7, Bronzed Parliment Butts	15
15, Bronzed Barrel Butts	15
13 to 15, Bronzed Flush Butts	15
67, Bolts, Chain	40
66, Bolts, Cottage	40
68, Bolts, Hotel Chamber	40
56, Bolts, Wrt Barrel, B. K. New list	50, 10 @ 10
56, Bolts, Wrt Barrel, T. K. New list	50, 10 @ 10
56, Bolts, Wrt Barrel, P. K. New list	50, 10 @ 10
Suppl. Bolts, Light, Wrt Barrel, Brass	50, 10 @ 10
Knob, New list	50, 10 @ 10
57, Bolts, Wrt Brass Barrel	35
57, Bolts, Wrt Brass Bib, Twd Bls	35
57, Bolts, Wrt Brass Bib, Twd Bls	35
62, Bolts, Canada, For. and Min. Plated	45
55, Bolts, Wrt Flat, feel Spring	30
Suppl. Bolts, Wrt Flat, Steel Spring	30
55, Bolts, Wrought Flat Tail	30
60 to 62, Bolts, Flush, Sunk and Rnd	35
64, Bolts, B. K. Flush, Common	30
63, Bolts, B. K. Flush, Ex. Heavy	30
63, Bolts, Plated K and Slide Flush	10
62, Bolts, Bronzed K. and Slide Flush	10
Suppl. Bolts, Plated K. and Slide Flush	10
59, Bolts, B. K. Wrought Shutter	35
55, Bolts, Wrt Shutter, "Stanley's"	50
59, Bolts, Wrt Shutter, "Stanley's"	50
59, Bolts, Shutter, T. K. Lock	30
59, Bolts, Shutter, Tinned Knob	30
58, Bolts, Wrt Shutter, Galvanized	40
59, Bolts, Wrt Square Spindle	30
52, Bolts, Wrt Store Door, New List	50, 10 @ 10
Suppl. Bolts, Wrt Store Door, New List	50, 10 @ 10
53, Bolts, Wrt Square and Round Neck	35
59, Bolts, Wrought Tower	30
29, Bolts, Light Inside Blind, Jap'd	30
29, Butts, Light Narrow, Japanned	30
31, Butts, Back Flaps	30
30, Butts, Table	30
32, Butts, Narrow	30
32, Butts, Chest	30
32, Butts, Chest	30
34, Butts, Broad	30
35, Butts, Loose Joint	35
34, & 35, Butts, Reversible, Our List	12 1/2
74, Butts, Light Inside Blind, Japanned	12 1/2
75, Butts, Light Inside Blind, Steel	12 1/2
29, Butts, Light Inside Blind, New Britain	40
Suppl. & 33, Butts, Light Narrow, List of Narrow	30
29, Butts, Bar, with Acorns	40
18 to 21, Butts, with Acorns	40
18 to 21, Butts, Loose Joint, with Japanned	40
Bronzed or Silvered Acorns	40
Suppl. Butts, Loose Joint, ditto	40
21, Butts, Fluted Acorns	40
21 to 27, Butts, Parliment	40
64, Corner Irons	30
72, Hammer, Carpet	30
70, Handles, Wrt Chest, "Stanley's"	40
70, Handles, Wrt Chest, "Anstin Beebe"	40
71, Handles, Lifting and Coffin	30
73, Stanchion Shutter	30
50, Hasps and Staples, Wrought	30
50, Hasps and Staples, Wrought	30
Suppl. Hinges, Heavy and Extra Heavy T. Hart's	30
30 to 43, Hinges, Strap and T. New list	35
44 and 45, Hinges, Long Chest	35
45 and 47, Hinges, Common Strap	35
46, Hinges, Bulk Shutter and Flap	35
48, Hinges, Norwich Blind	35
48, Hinges, Plate and Raised Blind	35
47, Hinges, Flat Plate and Raised Blind	35
Japanned Screws, American Screw Co.'s New list	50
69, Knobs, Canada Sash	35
69, Staples, Floor, Bolt and Lock	45
54, Step Ladder Joints	30
51, Washers, Wrought Iron, Our list. (See Supplement). Discount 7 cents per pound.	30
For a list of Wrought Iron Bars and Wrought Square Bolts, Light Narrow Butts, and Strap and T. Hinges, see Supplement. In comparing prices of Reversible Butts, Wrought Shutter Butts, Hasps and Staples, and Wrought Square Bolts, account is to be taken at expiration of 40 days from date of invoice will be subject to a slight draft, with interest and exchange, without notice. All goods at the risk of purchaser after shipment. We do not protect customers against decline in price after shipment of goods.	

W. H. Hart, Treasurer.

Roy & Co., West Troy, N. Y., issued the following discount sheet under date of 7th instant:

OFFICE OF ROY & CO.

Discount Sheet, May 7, 1875.—Terms Cash, 30 Days.

	Discount per cent. from List.
Strap and T. Hinges	35
Table Hinges	35
Back Flaps	30
Square Back Flaps	30
Flat Butts	30
Light Inside Blind Butts	30
Narrow Butts	30
Chest Hinges	30
Fewer Butts	30
Flat Joint Butts	30
Reversible Butts, Loose Pin	35
Loose Joint Butts	35
Fast Joint Plate Hinges	30
Loose Joint Plate Hinges	30
Hook Hinges, to drive	30
Screw Hook Hinges	30
Wrought Iron Felice Clips	30
Cold Pun bed Square Nuts, Large	7 1/2
Small	6
Hexagon Nuts, Large	7 1/2
Small	6
Wrought Iron Washers, Large	7 1/2
Small	6

Prices subject to the changes of the market, without notice.

In view of the above low prices, our terms will be strictly cash. We reserve the right to draw at sight for bills over due, adding interest after 30 days. All goods at the risk of purchaser after shipment.

J. Clark Wilson & Co. have just received a full assortment of Andrew's Auger Bits, which they will offer to the trade at a low price.

Fernald & Sise have taken the agency for the Auger Bits manufactured by the Humphreysville Mfg. Co. This is a new firm, who succeed the old firm of the same style. The goods, which we have seen, are well finished.

We invite the attention of manufacturers to the advertisement on 20th page, of the tenth industrial exhibition of the Mechanics' Institute, of San Francisco, which will be held in that city, commencing on the 17th of August next, and continuing open for at least one month. This will be an excellent opportunity for manufacturers to show their product on the Pacific coast.

H. M. Reed & Co., Erie, Pa., illustrate in their advertisement, on page 17, "The Erie Lawn Mower," improved and perfected for the season of 1875. They say of it:

The Machine has so few parts that nothing can get out of repair. It is so simple in construction that any one can understand it, and, weighing less than forty pounds, it works so

easily that a child can run it, and does the work so perfectly that all admire it. The gearing is so perfectly enclosed, and protected from dust and grass, that it seldom needs cleaning. The revolving cutter is so constructed that it is impossible for grass to wind around the shaft, thus enabling this machine to work without clogging.

They are made in two sizes, 14 inch and 16 inch cut, weighing 40 and 45 pounds respectively. The list price is

14 inch.....\$20.00, each.
16 inch.....\$24.00, each.

Discount to the trade 30 per cent.

H. M. Reed & Co. inform us that although this is only the second year they have been manufacturing these machines, they have already shipped over 1300 Lawn Mowers. Every portion of the machine is made by machinery, so that the parts can be duplicated if necessary. They are neatly painted, and are shipped in running order.

We published in our issue of last week a sketch of the life of the late D. R. Barton, of Rochester. We have since received the following information, which will be of interest to the Hardware trade: The business built up by the late D. R. Barton will be, and is now being, carried on under the same superintendence, with the same workmen, and in the same buildings.

Knowing for many days of the sure approach of death, and solicited for the welfare of his family, his workmen, and the continuance of his business enterprise, Mr. Barton decided to place his affairs in the best possible shape, and to that end the D. R. Barton Tool Co. was incorporated on the 23d day of April, 1875. Our readers will remember that only three days later Mr. Barton died. The trustees of the new company are five of the best known and most respected citizens of Rochester, Messrs

Effect of Impurities in Copper.

Dr. Hampe has made some experiments for the purpose of determining the influence of foreign substances upon metallic copper. The following are some of his results, which differ essentially from what had been expected.

Suboxide of Copper.—The presence of 0.05 per cent. of oxygen, which corresponds to 0.45 per cent. of suboxide, does not cause any perceptible decrease of ductility of copper, but renders it much less tenacious; 0.1 per cent. of oxygen, equal to 0.9 per cent. of suboxide, has little effect in the cold and none at all when hot; 0.25 per cent. oxygen, equal to 2.25 per cent. suboxide, causes a perceptible decrease of ductility when cold, but it is always about equal to that of ordinary refined cast copper, so that it can be used for all purposes. Short-hot is not caused by this quantity, but takes place when 0.75 of oxygen, equal to 6.7 per cent. of suboxide, is present. In general, the suboxide has the effect of making copper cold-short rather than hot-short, while Karsten gives just the opposite opinion.

Sulphur, as sub-sulphide (not present as such in the refined metal), renders copper cold-short. The presence of 0.05 per cent. of sulphur renders the copper more ductile than ordinary refined copper; even with 0.25 per cent. of sulphur the copper is quite ductile, but with 0.5 per cent. of sulphur it is very short when cold, but not when hot, and very soft.

Arsenic and Arsenic Salts.—Arsenate of copper acts upon chemically pure copper like a foreign body, which mechanically loosens the composition of the molecule. With small quantities there is merely a decrease of tenacity; with larger quantities it becomes very cold-short, and finally, hot-short, too. The presence of 0.4 per cent., which corresponds to 0.1 per cent. arsenic and 0.08 per cent. oxygen, imparts to the copper the qualities of excellent refined copper; 2 per cent., or 0.55 per cent. of arsenic, makes it very cold-short and hard, also some what hot-short and unfit for use. After the reduction of the sub-arsenate of copper, the metal is essentially improved in quality, and is more tenacious. Hot-short does not take place with 0.5 per cent. arsenic, appearing first with 1 per cent., but then it is no longer cold-short—quite different from the previously received theory of the effect of arsenic.

The suboxide of copper is more sensitive to arsenic acid than to antimonious acid, but an equal quantity of metallic antimony produces just as tenacious and ductile alloys as arsenic, and the limit for red-short is lower for antimony than for arsenic.

Lead.—The presence of 0.15 per cent. of lead in otherwise pure copper does not injure it, but rather renders it very ductile, without being hot-short; with 0.3 per cent. it becomes slightly hot-short, when rolled out very thin; with 0.4 per cent. and upward it is strongly hot-short and distinctly cold-short. The copper may be rolled out well enough, but is rotten, and breaks or scales when bent. If the quantity of lead exceeds a certain limit, the different alloys separate. This takes place in a marked degree in the presence of 1 per cent. of lead.

Bismuth, even in extremely small quantities, exerts a deleterious influence on the ductility, which is greater when hot than cold. With 0.05 per cent. of bismuth the copper is perceptibly cold-short and very hot-short; with 0.1 per cent. it is cold short, and at a bright red heat it crumbles. The simultaneous presence of antimony, along with the bismuth, considerably diminishes the injurious influence of the bismuth.

Over-toughened Copper.—When the operation of rolling, which is employed for the purpose of toughening the copper, has been carried too far, it is sometimes hot-short and sometimes not. It is hot-short if it contains antimonite or arsenite of lead or bismuth, which are reduced by over rolling, while copper free from such salts is full of bubbles and imperfect when hammered out, but not hot-short.

If the influences above mentioned of foreign admixtures upon the properties of copper be used as guide for judging of the quality a given specimen of copper from its composition, as established by analysis, it will be found that the actual ductility is always considerably less, at least for ordinary temperatures, than its constitution would indicate. In judging of the quality of copper the specific gravity, as well as the chemical composition, must be taken into consideration more than has heretofore been done, for it stands in close relation to its strength.

Coke from Anthracite Coal.

W. Penrose and W. F. Richards, of Swansea, Wales, have received a patent for an invention relating to the production of coke. It consists in the mixing or incorporating of anthracite or stone coal, or free burning steam coal, or coal known as Staffordshire slack, or other non-coking coals, with bituminous coal, or any other coal capable of making coke, with pitch or tar, or with any form of tar or bitumen, mineral oils containing bitumen, petroleum, such coal or coals being in a state of division. The mixture thus produced is to be placed in any well known form of oven or retort commonly used for coking, and the surface is then to be covered with a layer of bituminous coal or other bituminous matter. In carrying out this invention the inventors cause the coals to be disintegrated, or ground, by any well known disintegrator, such for example, as that known as "Carr's disintegrator," and to such disintegrated coals or mixture of the same—by preference in a moist condition—they add one or more of the above named ingredients, viz., pitch, tar, or any form of tar, bitumen, or mineral oils containing bitumen, petroleum, or

any of the waste products of petroleum, and they cause the same to be thoroughly mixed. When such mixture or incorporation has been effected, either by means of a disintegrator or pug-mill, or other incorporating apparatus, the minerals thus mixed are to be introduced into a convenient retort or any of the well known forms of coking ovens for the purpose of being converted into coke, and when placed in such oven or retort are to be covered with a layer of bituminous coal or matter, bituminous coal being preferred. The proportions in which the coals or mixtures of the same are to be employed, together with one or more of the before mentioned materials, will vary according to the quality of the coal or coals and the nature of the bituminous matter employed. They have found that good results may be obtained by employing from about sixty parts by weight of anthracite or stone coal of average good quality to about thirty-four parts by weight of bituminous or coking coal, and to about six parts by weight of pitch or ordinary coal tar. The layer of bituminous coal employed may vary from about 4 in. to 6 in. in depth, but, as we have before mentioned, these proportions and layers may be varied. This invention may be of especial interest to the owners of anthracite blast furnaces.

An interesting resume of the leading facts in early railway history will be found in the following extract from the late address of Thomas Allen, president of a Missouri railway, at St. Louis, viz: One of the most remarkable things about this wonderful railway system is that its beginning is within the memory of those now in the prime of life. Whoever is curious upon the history of it should read Smiles' story of the Life of George Stephenson. Whoever would see the first locomotives, will find the French example in the *Conservatoire des Arts et Metiers* in Paris, and the English one still preserved in Kensington Museum, in London. It was only forty-five years ago that the first locomotive, drawing a train of cars, at a speed exceeding ten miles an hour, appeared upon the Liverpool and Manchester Railway line, in England. George Stephenson had worked upon it for fifteen years to bring it up to the imperfect state in which it appeared. Tramways had existed from time immemorial, and they established the gauge of four feet eight and one-half inches, now the standard of American railways, which was simply the gauge of the ordinary road wagons, to which they were originally adapted. They were used at Quincy, in Massachusetts, in 1836, and at Mauch Chunk, in Pennsylvania, in 1827. But the first important line of railway was undertaken in this country by the Baltimore and Ohio, and opened fourteen miles, in 1828, and operated by horse-power. It is a disputed question, whether it was the first American locomotive, which appeared on this road, in 1830, built by Peter Cooper, New York, and ran from Baltimore to Ellicott's Mills, or whether it was a locomotive built by Governor Morris, of the West Point Works, which made its appearance on the Charleston and Hamburg Railroad of South Carolina. In 1833 this latter road was 136 miles long, and at that time the longest railway in the world. There is another question of some doubt, whether the first English locomotive in America, built by George Stephenson, appeared on the Baltimore and Ohio Railroad, or whether it was a little English locomotive, weighing six tons, which drew a train load of passengers on the Mohawk and Hudson Railroad, from Albany to Schenectady, in 1831. These movements in the construction of railways in New York, Maryland, and North Carolina, were nearly simultaneous. A student, then in college, I had the honor of witnessing the coming of this first train, as I then supposed, in America, into the astonished sight of the people of Schenectady, including all the students of Union college, in 1831. The locomotive was a very crude affair, and the cars were simply stage coaches, set on frames. These forms of coaches were an imitation of the English style, which is continued in England to the present day, and they were continued on the New York lines some ten or more years later.

The "Menominee Furnace" blew out on the last day of April, for the purpose of repairing their stack. They blew in for the first time May 1, 1874, and have lost eight days, giving them 357 working days, in which time they have manufactured 7316 gross tons of iron, making a daily average of over 20 tons; manufactured from soft wood coal; two-thirds of coal made from slabs from our mills, and an average of 136 bushels of coal to the ton has been used. No furnace in the land can probably show as fine a record in the economy and successfulness of the manufacture, or the superiority of the iron as practically tested. The fact that the demand has been equal to the supply establishes the reputation it has acquired at home and abroad, and speaks volumes for those who have had the direct supervision of its production. Work will be resumed as soon as repairs are made.

The above extract is from the Menominee (Michigan) Herald of the 6th inst. This furnace is 44 feet high with nine feet four inches bosh. The result is wonderful, considering the fuel used; before the furnace was built the pine slabs were burned up by the mill companies. The furnace is owned by A. B. Meeker & Co., of Chicago, and is located on the shore of Green Bay, and connected by tracks with the Chicago and Northwestern Railway.

Special Notices.

MANUFACTURERS

desirous of introducing their goods to the British and Continental Markets, are advised to insert advertisements in the newspaper "THE IRON AGE," published every Saturday, at 39 Cannon Street, London, E. C.

Scale: First 3 lines, 3/; every additional line, 10d. Price, 6d. per Copy, or 30, per annum, inclusive of postage to the United States.

Special Notices.

THE SIXTH Cincinnati Industrial Exposition

Opens for the reception of goods August 2, 1875. Opens to the public September 5th, and continues open until October 9th.

16 DEPARTMENTS, and an extended premium list in medals and gold coin.

Machinery Tested and Fully Reported upon.

Send for rules and premium list, and blank applications for space.

FRANK MILLWARD, Sec'y.

TENTH Industrial Exhibition

UNDER THE AUSPICES OF THE

Mechanics' Institute, OF SAN FRANCISCO.

Manufacturers, Mechanics, and others, are advised that the above Exhibition will be opened in San Francisco on the

17th day of August

next, and will continue open at least one month. The Board of Managers invite all who desire to exhibit, to send in their application for space with-out delay to Mr. J. H. CULVER, Secretary, 27 Post St., San Francisco, who will promptly answer all inquiries.

700,000 PERSONS

from all parts of the Pacific visited the Exhibition of 1874, to see what could be learned or purchased in San Francisco and the United States. San Francisco, with its population of one quarter of one million, in its intimate relations with Japan, China, Australia, Mexico, Hawaiian Islands, British Columbia, the various islands of the Pacific and contiguous domestic territory.

There is no charge of exhibiting, and power for driving machinery, etc., is furnished free.

By order of the Board of Managers.

A. S. HALLIDIE, Pres't.

Notice to Capitalists.

The Valuable Works and Property belonging to the Canadian Titanic Iron Company, Limited, at St. Urbain and Bay St. Paul,

Will be Sold by the Sheriff on the 18th of May next.

The Furnace, Tramway, Wharf, Buildings, &c., has cost nearly £80,000 sterling.

For particulars see the Official Gazette for the Province of Quebec, or apply to the undersigned.

E. H. DUVAL, Liquidator, C. T. I. Com. Ltd.

April 16, 1875.

NOTICE.

We beg to inform the Hardware Trade that, as successors of the former agents of the Washoe Tool Mfg. Co., we hold the only stock of Washoe Picks in the market. If orders are addressed to us they will be filled promptly, as far as our stock permits, and at a liberal discount.

(Signed) HOGAN & CLARKE.

Boston, May 18, 1875.

Wanted.

A partner with \$12,000 to \$20,000, to extend an established paying manufacturing business in the South. This will bear strict examination. Best references given and required.

Address, for particulars, D. W. M., Station H, New York City.

To Manufacturers.

Having established an Agency in Germany, we invite manufacturers to correspond with us regarding the introduction and sale of articles suitable for the European market. Address

LAU & GARLICH, 72 Beckman Street, New York.

DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

Iron and Steel Drop Forgings

in quantities to order at reasonable rates.

HERMANN BOKER & CO., Proprietors, 101 & 103 Duane St., N. Y.

THE McHaffie Direct Steel Castings Co.

Solid and Homogeneous, guaranteed to stand a Tensile strain of 25 tons per square inch. An invaluable substitute for expensive WROUGHT IRON FORGINGS for Iron Castings, where great strength is required. Office, cor. Franklin and Leavitt Sts., PHILADELPHIA.

Send for Circular and Price List.

Wanted.

By an experienced man, a situation to superintend the Practical Department of a Rolling Mill. One who understands the getting up of fine grained iron, and all kinds of puddled iron for all purposes; also, Bessemer steel. Has had large experience in managing works in England. Is a practical iron worker. Refers to Mr. W. Gill, Managing Director Teesdale Iron Works, Middlesboro', England; Mr. W. H. Brown, Blackhouse, Upper Thorpe, Sheffield, England. Address RICHARD JONES, Care FOXELL & JONES, Troy, N. Y.

WANTED A Good Second-hand Roll Lath that will suit to turn 8 and 12 in. Rolls. Send description and price. Address, SHAEER, JOHNSON & CO., Reading, Berks Co., Pa.

Special Notices.

TO LET, For Hardware Business,

Part of STORE, DESK or OFFICE ROOM.

EDWARD PHELAN, 113 Chambers and 95 Reade Sts., N. Y.

Briesen's Patent Agency

FOR SECURING INVENTIONS, TRADE MARKS, &c., IN AMERICA AND EUROPE.

No. 258 Broadway, New York. A. V. BRIESEN.

Charcoal Blast Furnaces.

Having during the past 10 years constructed and put in operation a number of the most successful Charcoal Blast Furnaces in the country, and having a competent corps of workmen constantly in my employ, I am enabled to offer advantages in constructing or remodeling upon the latest and most approved plans.

Examinations of Furnace Property made and reported upon when solicited. Correspondence promptly attended to.

J. M. WHITE, Engineer, 93 W. Alexander St., Rochester, N. Y.

Merchant Iron or Nails

Wanted in exchange for 300 tons No. 1 Wrought Scrap Iron.

GILCHRIST & GRIFFITH, Mount Pleasant, Iowa.

A. PURVES & SON, Corner South & Penn Streets, Phila., Dealers in

Scrap Iron & Metals, Machinery, Tools, Shafting & Pulleys, Steam Engines, Pumps & Rollers, Copper, Brass, Tin, Babbitt Metals, Foundry Facings. Best Quality Ingot Brass.

Cash paid for all kinds of Metals and Tools.

Wanted.

A situation as Blast Furnace Manager by a young man who thoroughly understands the practical management of Blast Furnaces, and has had several years' experience in smelting Titanic, Hematite and various other ores. The best reference can be given to influential gentlemen in the iron trade in England. Address, J. T. F., Office of The Iron Age, 10 Warren St., N. Y.

TO LET, A Light, Handsome Office.

Possession Immediately.

HERMANN BOKER & CO., 101 Duane Street, N. Y.

REMOVAL.

We have Removed our office and stock of Cutlery to

107 Duane St. PETERS BROTHERS.

To Manufacturers of Hardware, Cutlery or Files.—Manufacturers wanting a representative for the sale of their goods in New York, can hear of one by addressing W., Office of The Iron Age, 10 Warren St., N. Y.

JOBBER HARDWARE TRADE.—A gentleman of experience in purchasing Hardware, would like to make arrangements with some cut-town house, to act as their agent. Address, S., Office of The Iron Age, 10 Warren St., N. Y.

All GOOD BUTTER Makers

Should send for Illustrated Circular to

Orange Co. Milk Pan Co., Franklin, Del. Co., N. Y.

Discount to trade.

HARDWARE.

FOR SALE in the best business part of Jersey City, a first-class Tool and Hardware business. Established about 25 years, and doing a fair business.

Apply to H. LUTIGEN, 57 Montgomery St., Jersey City.

SPECIAL NOTICE.

I have three patents for Dies, Machinery, and Tools for making Angers and Bits, each running seventeen years; dated as follows: Dec. 19, 1855; January 31, 1856, and July 3, 1856. There is a special claim on each of the Dies. All persons infringing on said patents will be held responsible to the extent of the law. Russell Jennings, DEER FURN, Conn., Sept. 7, 1874.

DISCOUNT LISTS.

Iron Screws, Revised Lists, 13 Discounts, 75c. each. Files & Bolts, 13 Discounts, 75c. each. Address, with cash, DAYTON & LAMBERSON, 91 Chambers St., N. Y.

For Sale.

For Sale or Trade for Iowa or Nebraska Farm Lands.

A fine brick store, 40x80, with a fine well selected stock of Staple Hardware, Stoves, &c., of about \$5,000 to \$10,000. Situated on a principal street, in a flourishing Missouri river and railroad town in Nebraska. Address E. T. DUKE & CO., Plattsmouth, Neb.

For Sale, Hardware Business

In successful operation since 1845. Rare opportunity to secure an old and established business. Stock of General Hardware, Iron, Nails, &c., &c., will invoice \$6000 to \$8000. Two story brick business room, 25x30, with cellar under all, for \$3000. After first payment will make such terms as will be easy, and cannot fail to suit purchaser. Will assist purchaser at starting, if necessary. Satisfactory reasons for selling will be given. Address, C. U. RAYMOND, Cambridge City, Wayne Co., Ind.

For Sale, &c.

TO IRON AND STEEL MANUFACTURERS. FOR SALE.—At less than half its cost, a large Iron Rolling Mill, adjoining a blast furnace, with steam and water power; new machinery of latest improvements; a new building, 100x140 feet, with all other necessary buildings, and a steel converting furnace; nine acres of land on the Delaware and Hudson Canal; in a thriving village, 75 miles from New York. Address

THE RUSSEL IRON WORKS, G. W. Brown, Agent, 55 Liberty Street, Room 8, N. Y.

Iron Ore & Mineral Lands,

Thirty thousand acres, abounding in the several varieties of Hematite and Magnetic ores, covered with timber; limestone abundant; contiguous to one of the largest Railroads leading east and west, low freights insured; coal within 30 miles of Works. Consists of Charcoal Furnace and Forge of 300 tons a month capacity; fine manager's house, large store, stables and workmen's houses, &c. Labor 75c. a day; cost of Charcoal, 5c. a bushel; Iron ore, \$1.75 a ton; lime stone, 80c., all delivered at Furnace. Freight to Pittsburgh, \$3.50, Baltimore, \$2.40. Ores can be placed in Pittsburgh almost beyond competition. For sale, or will be operated jointly. Address, P. O. Box 863, Baltimore, Md.

LOWE & THOMASSON, Chattanooga, Tenn., Dealers in

MINERAL LANDS.

Surveys Made and Titles Investigated. Parties desiring information or wishing to purchase ore or coal lands within the States of Tennessee, Alabama or Georgia, are respectfully requested to communicate.

We have For Sale Very Cheap

Two of the Finest Charcoal Properties in America. Brown Hematite Ore, 56 per cent. Metallic Iron, and less than 1-30th of 1 per cent. of Phosphorus. Car Wheel Iron can be made for \$16 per ton. Also 6400 Acres Bituminous Coal Lands, for which part payment will be taken in Northern Pacific R. R. Bonds.

For Sale,

Eight hundred Bars, assorted sizes, ENGLISH TOOL STEEL, Naylor's, Sanderson's and Jessup's, low, to close out the stock. Send for list sizes.

JACKSON & TYLER, 16 German Street, Baltimore, Md.

STEAM PUMPS FOR SALE.

1 Pair (Gould & Garrison) Vacuum Pumps, 16 inch air and 10 inch steam cylinders. 1 Steam Pump (Gould & Garrison), 12 inch water and 24 inch steam cylinders.

The above has been used six months, and will be sold very cheap.

J. R. JOHNSON, Richmond Steam Forge, Richmond, Va.

FOR SALE.

An 1/2 inch mill train for making Merchant, Band and op Iron. Will be sold cheap.

Apply to W. W. JONES, Near the Lehigh Valley Railroad Depot, Allentown, Pa.

To Stove Manufacturers and Foundrymen.

The Carbon Stove Company, 61 Burlington, N. J., Will sell their Foundry, with all its appurtenances, business and good will, upon very liberal and accommodating terms, offering to any party wishing to engage in the Stove or general Foundry Business a rare opportunity.

The Foundry Buildings, which are of a capacity to employ forty or more molders, are very conveniently located upon navigable tide water on one side, and the Pennsylvania Railroad, with its freight station in front, being on the direct line between New York and Philadelphia.

The Buildings, Machinery and Appliances are all in prime order, and the assortment of Patterns, &c., for Stove, Range or Heater work, unsurpassed. Address, for terms or other particulars, CARBON STOVE CO., Burlington, N. J.

FOR SALE.

At Lowest Manufacturers' Rates, GUNS & SHEET ZINC, Best German and Belgian Brands,

By LOUIS WINDMULLER & ROELKER, 20 Reade Street, N. Y.

For Sale, Stove and Tin Business.

Will sell, on good terms, one of the best arranged House Furnishing Stores in Canada West, at St. Thomas. The premises are roomy, the buildings having been arranged especially for this trade, with Tinmith's workshops and benches complete for 12 men.

Present Stock about \$6000.

St. Thomas is the head quarters of the Canadian Southern Railway Co. To a practical, energetic man this offers unusual advantages. Business well established and with good connection. Reason for disposal, present proprietors increasing their who'sale and retail Hardware Store next door to the above premises. Address

HORSTMAN & HORSTMAN, Iron and Hardware Merchants, St. Thomas, Canada West.

FOR SALE,

at 10c. a copy, general Spanish Weekly Market Review, written and published by the subscriber, 20 May, 1875, number 190, circulating in Mexico, the West Indies, Central and South America, including Brazil, Spain and Manila, on which certain standard articles of American manufacture are quoted. The undersigned is also

Translator for Manufacturers and Land Companies, from and into the ENGLISH, SPANISH, FRENCH, and GERMAN.

Spanish Catalogues got up correctly and with despatch. Address, C. KIRCHHOFF, Metal Reporter of "The Iron Age," Box 3091, N. Y.

Trade Report.

Office of The Iron Age.
WEDNESDAY EVENING, May 19, 1875.

During the week under review little has transpired to vary the monotony of almost unusual dullness. In general trade but little of profitable activity is reported, and owing to the restricted demand for it, money remains easy and abundant. Borrowers on call are accommodated at 2 @ 3 per cent., and the discount rate on prime commercial paper is 4 @ 5 per cent.

The gold market has been strong, partly on account of heavy shipments and partly because of a movement to organize another clique to lock up gold and disturb things generally. Foreign exchange declined to \$4.87 @ \$4.90 for prime bankers' sterling. The following shows the daily range of the premiums:

	Highest.	Lowest.
Thursday.....	115 1/2	115 1/2
Friday.....	115 1/2	115 1/2
Saturday.....	115 1/2	115 1/2
Sunday.....	115 1/2	115 1/2
Tuesday.....	115 1/2	115 1/2
Wednesday.....	115 1/2	115 1/2

Government bonds have been strong in sympathy with gold in this market, and steady in London. On Saturday the Secretary of the Treasury issued another call for \$5,000,000 of five-twelves, interest to cease August 1st, making \$35,000,000 in all of the new notes taken by the Syndicate. There is a good investment demand for railway mortgages at advancing prices. We give below the closing quotations of governments.

The stock market has experienced a sudden decline, and speculative shares are generally regarded with disfavor by those who have capital to risk in Wall street operations. The principal dealings have been in Lake Shore, Pacific Mail, Erie, Western Union, Rock Island and Union Pacific. We give below the highest and lowest of to-day's quotations for active shares.

The bank statement shows an increase in all items except circulation, which has fallen \$124,000. The following is a comparison of the averages for the last two weeks:

	May 8.	May 15.	Differences.
Loans.....	\$283,000	\$283,000	Inc. \$1,796,100
Deposits.....	10,100,000	10,350,500	Inc. 250,500
Leg. Ten.....	58,017,500	59,356,300	Inc. 1,338,800
Deposits.....	227,873,300	231,921,300	Inc. 4,048,000
Circulation.....	20,488,400	20,363,900	Dec. 124,500

The following tables show the foreign trade movements for the week:

	IMPORTS.		
	1873.	1874.	1875.
Total for week...	\$7,938,263	\$7,523,869	\$4,550,362
Prev. reported...	163,925,177	151,226,213	132,184,684

Since Jan. 1.....\$171,183,440 \$158,750,089 \$126,735,046

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Anvils.....	41	\$449
Brass goods.....	318	318
Bismuth.....	9	634
Bronzes.....	9	1,881
Chains and anchors.....	30	569
Copper.....	175	175
Cutlery.....	55	18,715
Guns.....	45	5,935
Hardware.....	31	2,445
Iron, pig, tons.....	10,664	10,664
Iron, cotton ties.....	1,008	2,856
Iron, other, tons.....	181	11,274
Metal goods.....	241	31,169
Needles.....	11	373
Platina.....	1	234
Per. caps.....	1	2,066
Saddlery.....	4	4
Steel.....	3,045	32,219
Silverware.....	4	173
Tin, boxes.....	10,168	73,411
Tin, 1000 slabs.....	138,356	26,278
Wine.....	373	3,418

EXPORTS, EXCLUSIVE OF SPECIE.			
	1873.	1874.	1875.
For the week....	\$5,482,894	\$6,604,654	\$4,106,551
Prev. reported...	100,640,538	100,700,304	85,144,965

Since Jan. 1.....\$105,128,482 \$107,304,588 \$89,351,516

EXPORTS, EXCLUSIVE OF SPECIES.

	1874.	1875.
Total for the week.....	\$2,222,115	\$2,222,115
Previously reported.....	93,533,294	93,533,294

Total since January 1, 1875.....\$30,756,699

Same time in 1874.....16,008,682

Same time in 1873.....19,138,807

Government bonds at the close were strong,

with quotations as follows:

	Bid.	Asked.
U. S. Currency 6's.....	124 1/2	124 1/2
U. S. 6s 1861, reg.....	122 1/2	122 1/2
U. S. 6s 1861, cou.....	124 1/2	124 1/2
U. S. 1862, 5-30 reg.....	117 1/2	117 1/2
U. S. 5-30 1862, cou.....	117 1/2	117 1/2
U. S. 5-30 1864, reg.....	117 1/2	117 1/2
U. S. 5-30 1864, cou.....	118 1/2	118 1/2
U. S. 5-30 1865, reg.....	119 1/2	119 1/2
U. S. 5-30 1865, cou.....	120 1/2	120 1/2
U. S. 5-30 1866, reg.....	122 1/2	122 1/2
U. S. 5-30 1866, cou.....	123 1/2	123 1/2
U. S. 5-30 1867, reg.....	124 1/2	124 1/2
U. S. 5-30 1867, cou.....	125 1/2	125 1/2
U. S. 5-30 1868, reg.....	126 1/2	126 1/2
U. S. 5-30 1868, cou.....	127 1/2	127 1/2
U. S. 5-30 1869, reg.....	128 1/2	128 1/2
U. S. 5-30 1869, cou.....	129 1/2	129 1/2
U. S. 5-30 1870, reg.....	130 1/2	130 1/2
U. S. 5-30 1870, cou.....	131 1/2	131 1/2
U. S. 5-30 1871, reg.....	132 1/2	132 1/2
U. S. 5-30 1871, cou.....	133 1/2	133 1/2
U. S. 5-30 1872, reg.....	134 1/2	134 1/2
U. S. 5-30 1872, cou.....	135 1/2	135 1/2
U. S. 5-30 1873, reg.....	136 1/2	136 1/2
U. S. 5-30 1873, cou.....	137 1/2	137 1/2
U. S. 5-30 1874, reg.....	138 1/2	138 1/2
U. S. 5-30 1874, cou.....	139 1/2	139 1/2
U. S. 5-30 1875, reg.....	140 1/2	140 1/2
U. S. 5-30 1875, cou.....	141 1/2	141 1/2

The following were the highest and lowest

prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated.....	104 1/2	104 1/2
Lake Shore.....	65 1/2	65 1/2
Rock Island.....	103 1/2	103 1/2
New Jersey Central.....	110 1/2	110 1/2
Michigan Central.....	67 1/2	67 1/2
Cleveland & Pittsburgh.....	9 1/2	9 1/2
Wabash.....	10 1/2	10 1/2
Western Union Telegraph.....	77 1/2	76 1/2
Atlantic and Pacific Telegraph.....	25 1/2	24 1/2
Northwestern.....	80 1/2	80 1/2
Prof.....	53 1/2	53 1/2
Milwaukee & St. Paul.....	36 1/2	35 1/2
Panama.....	14 1/2	14 1/2
Pacific Mail.....	37 1/2	37 1/2
Erie.....	25 1/2	25 1/2
Ohio & Mississippi.....	25 1/2	25 1/2
Union Pacific.....	70 1/2	70 1/2
Missouri Pacific.....	59 1/2	59 1/2
Atlantic & Pacific Preferred.....	15 1/2	15 1/2
C. C. & Ind. Cen.....	5 1/2	5 1/2

GENERAL HARDWARE.

Trade in General Hardware is not as active as it was a week ago. In the matter of prices there are no changes of importance to note.

The demand for Foreign Hardware shows no sign of improvement, and quotations of leading goods continue without change.

There is nothing new to report regarding the Nail market. The stocks in this city are in many instances broken, but the demand is not sufficient to allow this circumstance to have an enhancing influence as regards price. We continue to quote 10d., in lots of 300 kegs and

over, at \$3.25, net, with no disposition on the part of holders to shade this figure for a large order. Small lots are quoted at \$3.35 @ \$3.40. Trade in House Furnishing Goods, Tinners' Trimmings, &c., presents no new feature. The combination prices agreed upon by the manufacturers of Stamped and Re-tinned goods are, we are informed, adhered to, and we hear of no cutting in prices. The demand has fallen off during the past week.

The Stanley Rule and Level Company have introduced a new and greatly improved feature into Bailey's Patent Block Plane No. 9 1/2, as will be seen by reference to the engraving in their advertisement on page 26 of this paper. The Plane Iron is moved by means of a thumb screw, which admits of a nicer adjustment than with a lever, as formerly used; and the eccentric movement given by a lever, which has a tendency to slide the iron to one side, is dispensed with entirely. Plane No. 9 1/2 is also adjusted in the same manner now; and the handle being secured to the stock by a nut, it can readily be removed or replaced at the convenience of the owner.

J. Clark, Wilson & Co. continue to act as New York agents for D. H. Whittemore, manufacturer of Coring, Paring and Slicing Machines, and all orders received from territory which can properly go to New York, will be executed by them. Prices for the coming season will be as follows, viz.:

"Bay State" Coring, Paring and Slicing Machine, per doz.....	\$15.00
Less than 5 doz.....	10 1/2
10 doz.....	15 1/2
25 doz.....	25 1/2
"Skeleton" Coring, Paring and Slicing Machine, per doz.....	\$8.00
Less than 5 doz.....	5 1/2
10 doz.....	10 1/2
25 doz.....	15 1/2
"Bay State" Peach Parer, per doz.....	\$12.00
Less than 5 doz.....	10 1/2
10 doz.....	15 1/2
25 doz.....	25 1/2
"Peach Stoner and Haiver," per doz.....	\$6.00
Less than 5 doz.....	5 1/2
10 doz.....	10 1/2
25 doz.....	15 1/2

Union Improved Apple Parer, with Table and Push Off, per doz.....\$7.75

The manufacturer says: "The 'Skeleton' Corer, Parer and Slicer has been greatly improved in the manner of holding and setting the slicer knife. This makes it a perfect and easy working machine, while doing three times the work of any other machine, save the 'Bay State.' Its cost is but a trifle over the ordinary Parers."

Van Wagener & Williams, No. 82 Beekman street, issue a new catalogue of Door Springs made by them, which embraces many favorably known in the market, viz: The Gem Coil Spring, the old style Rod Spring known to the trade for many years as "Torreys," and Gray's Improved Rod Springs, Nos. 1 and 2. This firm have recently moved to their present location, where they have a fine office and salesroom, and superior manufacturing facilities, all in the same building. They make a specialty of Door Springs and Spring Hinges, and are the manufacturers of the well and favorably known "American Spiral Spring Butts." The Door Spring market has hitherto been supplied by several manufacturers, but the downward tendency of prices that has prevailed during the past few years has had the effect usual in such cases, of concentrating the business, and Van Wagener & Williams are the first to supply a full line of the most approved Springs. They guarantee all their Springs, in the manufacture of which, we are informed, they use nothing but the very best materials. They also manufacture, at their establishment in Beekman street, the "Domestic" Blind Adjusters, Gray's Adjustable Bench Clamps, Gray's Ratchet Bed Keys, and other articles for the Hardware trade.

G. Webster Peck, No. 110 Chambers street, has issued the following list of Croquet for the season of 1875, manufactured by the American Croquet Co., for whom he is agent. These goods are well finished, and the assortment is very complete. He is prepared to fill orders from stock. The regular discount from the list is 10 @ 15 per cent.:

DESCRIPTIVE PRICE LIST OF THE AMERICAN CROQUET COMPANY.

The attention of the trade is called to the following facts in reference to this Croquet.

The Lumber is all most thoroughly seasoned, having been dried in a kiln for nearly 12 months.

The Balls are made of selected Hard Maple, and being turned in a new patent machine, are regular spheres.

The company holds an exclusive right to the use of several patents, which enables them to turn out a uniform Ball, Handle and Mallet, which is quite indispensable to scientific playing. They have adopted a new method of grading, which for simplicity and security cannot be surpassed. No Nails are driven into the boxes.

No. 1, Hard Maple—Four barrel shaped mallets; four balls; Linden Wood—Eight fancy croquet arches. Fat up in heavy mallet bag, each set separate, and 25 sets in a box.....\$1.00

No. 2, Hard Maple—Eight mallets and balls, neatly painted, with some slight defects; maple or hickory handles; two stakes; arches, book, etc. Complete in dovetailed box.....2 00

No. 3, Hard Maple Set—Eight concave-shaped mallets; eight maple balls; white ash and maple handles; stakes, arches and book; painted and varnished. Complete in dovetailed box, and warranted perfect.....\$2.50

No. 4, Hard Maple Set—Eight concave-shaped mallets; eight selected maple balls; white ash or maple handles; painted with oil and varnish finish; stakes, arches, etc. Complete in dovetailed case—a very desirable set.....3 25

No. 5, Selected Hard Maple Set—Eight fancy turned concave-shaped mallets; eight selected maple balls; maple or white ash handles; painted with oil and varnish finish; stakes, arches, etc. Complete in dovetailed case.....5 00

No. 6, Selected Hard Maple Set—Eight fancy turned concave-shaped mallets; eight selected maple balls; maple or white ash handles; painted with oil and varnish finish; stakes, arches, etc. Complete in dovetailed case.....5 00

No. 7, Apple Wood Set—Eight design mallets, club shape, of apple wood, six inches long; eight choice selected maple balls, double striped; extra large fancy stakes; heavy

arches; handsomely painted and finished; complete in large black walnut case, lined with the finest red made of American wood.....6 50

Order sample crate. Packed five sets in each crate.

The Stanley Works, New Britain, Conn., and 79 Chambers street, New York, issued the following revised discount sheet under date of 7th inst. The advance in the price of Wrought Butts we noticed last week:

Circular No. 76, May 7th, 1875.

STANLEY WORKS.

Advances and discounts on price list of October, 1870, and supplement of February 5, 1874. Terms, net cash, 30 days. Payable in New York current funds. Freight as heretofore. Prices subject to changes of the market without notice.

Catalogue pages.....Discount per cent.

4 and 5, Bronzed Capped Butts.....45

Supp't. Bronzed Loose Joint Butts with Acorns.....45

Supp't. Bronzed Loose Joint Butts, no Acorns.....45

8 to 12, Bronzed Narrow Butts, etc.....45

8, Bronzed Light Narrow Butts.....45

11, Bronzed Light Inside Blind Butts.....45

15, Bronzed Barrel Bolts.....45

15 to 15, Bronzed Flush Bolts.....45

67, Bolts, Chain.....45

68, Bolts, Hotel Chamber.....45

56, Bolts, Wrt Barrel, B. K. New List.....50, 10 & 10

58, Bolts, Wrt Barrel, T. K. New List.....50, 10 & 10

59, Bolts, Wrt Barrel, T. K. New List.....50, 10 & 10

Supp't. Bolts, Light, Wrt Barrel, Brass Knob, New List.....50, 10 & 10

57, Bolts, Wrt Barrel.....35

58, Bolts, Wrt Barrel.....35

65, Bolts, Canada, For. and Min. Jap'd.....45

65, Bolts, Canada, For. and Min. Jap'd.....45

55, Bolts, Wrt Flat, Steel Spring.....30

56, Bolts, Wrt Flat, Steel Spring.....30

57, Bolts, Wrt Flat, Steel Spring.....30

60 to 62, Bolts, Sunk and Proj.....15 1/2

64, Bolts, B. K. Flush, Common.....30 1/2

65, Bolts, B. K. Flush, Ex. Heavy.....30 1/2

68, Bolts, Plated K. and Slide Flush.....10 1/2

68, Bolts, Plated K. and Slide Flush.....10 1/2

Supp't. Bolts, Plated K. and Slide Flush.....10 1/2

59, Bolts, B. K. Wrought Shutter.....35

59, Bolts, B. K. Wrought Shutter.....35

58, Bolts, Cased Shutter.....15

59, Bolts, Shutter, T. K. Lock.....15 1/2

59, Bolts, Shutter, Tinned Knob.....30

57, Bolts, Shutter, Tinned Knob.....30

57, Bolts, Southern Door.....40 1/2

52, Bolts, Wrt Square Spring, New List.....50, 10 & 10

52, Bolts, Wrt Square Spring, New List.....50, 10 & 10

53, Bolts, Wrt Square Spring, New List.....50, 10 & 10

54, Bolts, Wrought Tower.....30

29, Bolts, Light Inside Blind, Jap'd.....30

31, Bolts, Light Inside Blind, Jap'd.....30

31, Bolts, Back Flaps.....30

30, Bolts, Inside Blind.....30

30, Bolts, Inside Blind.....30

32, Bolts, Chest.....30

32, Bolts, Chest.....30

32, Bolts, Pew Door.....30

34, Bolts, Broad.....35

34, Bolts, Broad.....35

Sup. & 28, Bolts, Reversible, Our List.....12 1/2

74, Bolts, Reversible, Japanned.....13 1/2

25, Bolts, Light Inside Blind, Stanley's.....35 1/2

24 to 27, Bolts, Light Inside Blind, Stanley's.....35 1/2

24 to 27, Bolts, Light Inside Blind, Stanley's.....35 1/2

64, Corner Irons.....30

72, Hammers, Carpet.....30

70, Handles, Flush Chest and Drawer.....40 1/2

70, Handles, Flush Chest and Drawer.....40 1/2

70, Handles, Wrt Chest, Stanley's.....35 1/2

70, Handles, Wrt Chest, Stanley's.....35 1/2

71, Handles, Lifting and Coffin.....50

71, Handles, Window Shutter.....20

50, Hasps and Staples, Wrought.....30 1/2

50, Hasps and Staples, Wrought.....30 1/2

50, Hasps and Staples, Wrought.....30 1/2

50, Hasps and Staples, Wrought.....30 1/2

50, Hasps and Staples, Wrought.....30 1/2

50, Has

**STANDARD
32 Cal.
Just Out.**



Prices Reduced for Little Joker, STANDARD, Paragon, Tycoon & Whitney's Revolvers.

**ILLUSTRATED CATALOGUE OF
GUNS, RIFLES, PISTOLS, MATERIAL,**

Shooting Tackle, &c., furnished to DEALERS only.

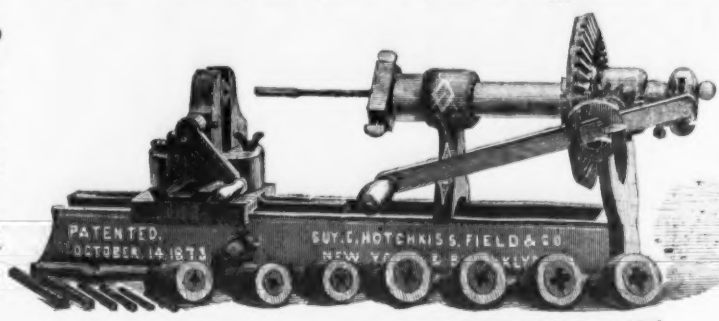
P. O. Box 5380.

SCHOVERLING & DALY, 84 and 86 Chambers Street, N. Y.

Guy C. Hotchkiss, Field & Co.,

85 First St., Brooklyn, E. D., and New York City.

"Champion" Thread Cutting



and Nut Tapping Machine.

This machine has revolving and sliding jaws, which enables the operator to cut all kinds work, no matter how irregular in shape it may be. It cuts a perfect thread at once going over. As much work can be done in one hour by this machine as in a day with stocks and dies. Send for Circular.

Manufacture Carriage Materials, Axles, Springs, Blacksmiths' Supplies, Bolts, Wood Work, Trimmings, &c.

IMPORTERS AND DEALERS IN

IRON AND STEEL.



FOR MELTING ALL KINDS OF METALS.

And Manufacturers of

Sunny Side Stove Polish.

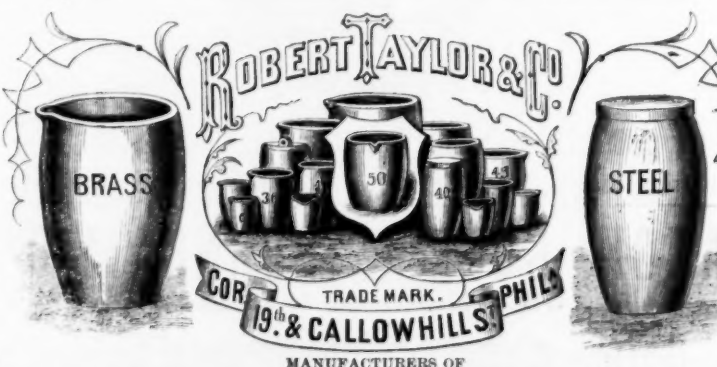
Lumber Pencils, Foundry Facings and Lubricating Plumbago.

STROW, WILE & CO.,

Nos. 1324, 1326, 1328, 1330, 1332 & 1334 Callowhill St., Phila.

GENERAL AGENTS:

Messrs. HALL & CARPENTER, 709 Market St., Phila.



BLACK LEAD CRUCIBLES

Of all Sizes and Forms for melting

Steel, Brass, Gold, Nickel and all kinds of Metals.

Mr. Robert Taylor, who was for seven years the head of the late firm of Taylor, Strow & Co., and who is a practical mechanic, and familiar with all the details of the manufacture of Crucibles, attends personally to our manufacturing department. We would, therefore, respectfully solicit a continuance of the favors hitherto extended to him.

ROBERT TAYLOR & CO.,

No. 1900, 1902, 1904 & 1906 Callowhill, St., Philadelphia.

General Agents. {MERCHANT & CO., 507 Market Street, Philadelphia.
{PARK & CO., 123 Second Avenue, Pittsburgh, Pa.

BUSH HILL IRON WORKS,

Corner 16th & Buttonwood Streets,
PHILADELPHIA.

JAMES MOORE,

(Successor to MATTHEWS & MOORE,)

Engineer, Machinist, Founder and Boilermaker

CASTINGS of every description.

ROLLING MILL AND FURNACE EQUIPMENTS COMPLETE.

Rolls Turned for Rails, Beams, Angles, and all shapes for Iron, Steel, or Composition Metals.

Sugar Mill, Saw Mill and Crist Mill Machinery,

AND MILLWRIGHTING IN GENERAL.

BOILERS—FLUE, TUBULAR AND CYLINDER, and all kinds of
TANK AND PLATE IRON WORK.



HERCULES IRON CUTTER.

No. 1, weight 16 lbs., cuts $\frac{3}{4} \times 2$ inch, or $\frac{3}{4}$ inch round or square. Price \$25.00

No. 2, " 105 " " $\frac{5}{8} \times 3$ " " " " " 50.00

No. 3, " 350 " " $\frac{5}{8} \times 4$ " " " " " 75.00

This is by far the most powerful Iron Cutter in use which can be worked by hand, having three times the capacity of any other machine which sells at the same price. The No. 3 machine occupies a space of 12x30 inches; when in use additional space must be had for the lever to work in. We send two sets of knives with each machine—one for square and flat, the other for round iron and steel. By using the knives adapted to it, round iron is cut without being flattened. One man can cut the largest size iron named above, but two would be required for steady work. It does not take a minute to change the knives or to shift the machine from large to small sizes.

MILLERS FALLS CO.—Enclosed find draft for amount of invoice, January 7. We would have sent the amount before, but did not have an opportunity of trying the Iron Cutter until a few days ago. It is one of the best machines we ever saw.

Office of the ATHENS FOUNDRY AND MACHINE WORKS, ATHENS, GA., February 18, 1875.

H. L. PRATT, President.—Dear Sir: Enclosed find draft made payable to your order by Messrs. Childs, Nickerson & Co., in payment for Iron Cutter. We have put our Cutter to good service, and find it cuts readily $\frac{1}{4}$ round, and $3\frac{1}{2} \times \frac{1}{2}$ square iron. C. N. & Co. are pleased with theirs, say it will save many a blow and cold chisel in their iron house.

Truly, yours, R. NICKERSON, Agent.

We make a satisfactory discount to dealers, and warrant the cutters to do all which we claim for them. Send for prices.

Millers Falls Company,

No. 78 Beekman Street, New York,

Sole Proprietors and Manufacturers of the

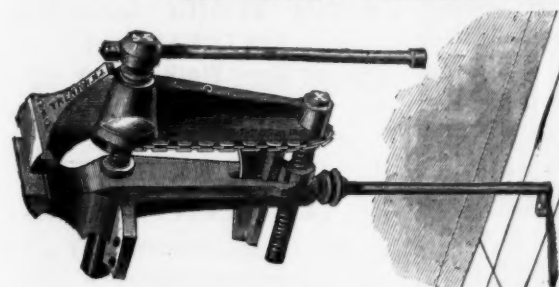
Barber Self-Fitting Bit Braces, Millers Falls Vises,

Improved Angular and Ratchet Drilling Machines,

TUBE SCRAPERS, FAMILY TOOL CHESTS,

Patent Adjustable Tool Holders, Mitre Boxes, Ratchet Braces, Breast Drills, etc.

The New Double Screw Parallel "Leg" Vise.



We are now ready to furnish, as the result of more than thirty years' experience, our latest style of Vise—the best yet made. It is stronger than any other, whether of Foreign or of American make; always parallel and holding with a slight "grip." The jaws are of convenient shape for the workman to get near his work equally well for filing or chipping. Instead of the heavy, clumsily formed jaws of the cast iron Single Screw Vises of the common "parallel" type, and which, depending upon slides alone for preserving parallelism, can never be screwed up very hard without "jamming" on the slides or breaking.

Our New Vise combines all the advantages of the "Peter Wright" Leg Vise, of strength and lightness, fastening to the floor and bench, and at the same time greatly superior to it; is always perfectly parallel at all points of opening, and never gets out of line. Embodying the same general principle as the well known Chain Vise, so long made by us, we have by new, scientific proportioning of all the parts, and with our recently improved metals for their manufacture, obtained so perfect a tool, that we now warrant these Vises for three years from date of manufacture standing upon each.

The jaws are of best Tool Cast Steel, welded on, file cut and properly hardened. The screws are forged of the best refined iron, and work in solid cut thread boxes.

The lower screw maintains the parallel position of the two jaws, by having exact motion with the upper working screw through the connecting chain which regulates it.

The chain is very accurately made of steered links and rivets, and having no strain of the work upon it, is therefore as durable as all the other parts.

Prices with Special Discounts to the Trade.

No.	Jaws	in. x in.	Screws	in. diameter	Lever	in. long	Opens	in.	Price
1	4	4	1	1	1	1	1	1	\$5.00
2	4	4	1	1	1	1	1	1	13.00
3	6	6	1	1	1	1	1	1	17.00
4	6	6	1	1	1	1	1	1	22.00
5	8	8	1	1	1	1	1	1	30.00
6	8	8	1	1	1	1	1	1	34.00

All sizes of these Vises furnished with Swivel Attachment, at an additional cost of \$1 to \$5. Sold at the General Agencies.

THESE GOODS ARE SOLD BY THE GENERAL AGENTS with special discounts to the trade.

New York—Messrs. J. CLARK WILSON & CO.—RUSSELL & ERWIN MANUFACTURING COMPANY.—Messrs. HORACE DURRILL & CO. Boston.—Messrs. GEORGE H. GRAY & DANFORTH. Philadelphia.—Messrs. JAMES C. HAND & CO. Baltimore.—Mr. W. H. COLE.

PATENT BOLT HEADER

Manufactured by

WILLIAM GARDNER'S SONS,

575 Grand Street, N. Y.

Having investigated the comparative merits of this and all other machines, we can recommend it as the Best Bolt Header ever made.

It will command itself for simplicity, durability, quality and quantity of work over all others. It will make perfect Square or Hexagon Bolts, in from 3 to 5 revolutions, and runs at the rate of one hundred and twenty revolutions per minute. Plough, Track, Button-head Bolts, and all similar heads are made with one revolution.

To show that it will stand the test of long continued strain, it has made eleven tons of half-inch Bolts from one-and-one-quarter to two-and-one-half inches long; eighteen tons five-eighth Bolts; twenty-six tons three-quarter Bolts, and thirty-seven tons seven-eighth Bolts, by one set of dies for each size, without change or repairs. It makes and cuts off the bolt from the heated bar, from one to ten inches, or of any greater length cut for the purpose, and either round or square iron may be used.

ANY STYLE OF HEAD CAN BE MADE, INCLUDING

Square, Hexagon, T, Button, Countersunk, Cone, Plough and Track Bolts, &c., &c.

OLIVER'S CHILLED PLOWS.



These implements, though but four years before the public in their present form, show the following remarkable record:
1506 were sold in the season of 1871. 7472 were sold in the season of 1873. 30,000 will be made for the season of 1875.
3049 were sold in the season of 1872. 14,976 were sold in the season of 1874. For full descriptive circulars, address,

SOUTH BEND IRON WORKS, South Bend, Ind.

Pipe, Fittings, &c.

Thomas T. Tasker, Jr.

Stephen P. M. Tasker

MORRIS, TASKER & CO.,

PASCAL IRON WORKS, Philadelphia,

TASKER IRON WORKS, New Castle, Del.,



Office, Fifth and Tasker Streets, Philadelphia.

Office and Warehouse, No. 15 Gold Street, New York.

Office and Warehouse, No. 36 Oliver Street, Boston.

MANUFACTURERS OF

WROUGHT IRON WELDED TUBES,

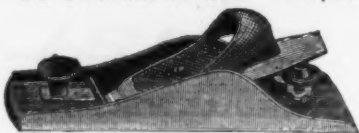
Plain, Galvanized and Rubber-Coated, for Gas, Steam and Water.

Lap-Welded Charcoal Iron Boiler Tubes.

Oil Well Tubing and Casing, Gas and Steam Fittings, Brass and Steam Fitters' Tools, Cast Iron Gas and Water Pipe, Street Lamp Posts and Lanterns, Improved Coal-Gas Apparatus, Improved Sugar Machinery, Etc.

BAILEY'S PATENT ADJUSTABLE PLANES.

IRON AND WOOD. 30 different styles.. 90,000 ALREADY IN USE.

Smooth Planes,
Jack Planes,
Fore Planes,
Jointer Planes,
Block Planes,
Rabbit Planes,
Circular Planes.Carpenters,
Cabinet Makers,
Car Builders,
Carrage Makers,
Millwrights,
Wheelwrights,
All Use them.

[No. 9½ Excelsior Block Plane, \$2.00.]

Manufactured by the STANLEY RULE & LEVEL CO.,

Factories: New Britain, Conn.

Warerooms: 35 Chambers Street, New York.

**Ecton Mills Genuine London
TURKEY EMERY.**

TRADE MARK.



ABBOTT & HOWARD, Agents for the United States.

81 John Street, New York.

35 Oliver Street, Boston.

EATON, COLE & BURNHAM CO.,

58 John Street, New York.

MANUFACTURERS OF

Wrought Iron

PIPE,

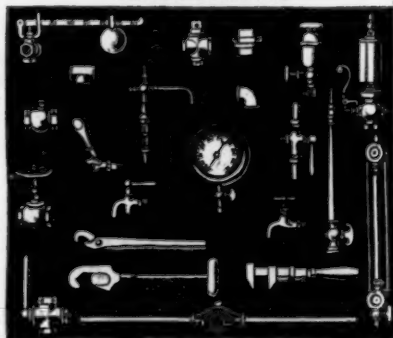
Cast Iron

FLANGED PIPE,

Cast Iron

RADIATORS

and BOILERS.



Brass & Iron

STEAM

Gas & Water

FITTINGS.

PLUMBERS'

MATERIALS.

STEAM GAUGES, TOOLS,

And all Supplies used by Machinists, &c.

TRADE

HOUSE ESTABLISHED, 1862.

GEORGE S. FALES,

SUCCESSOR TO

FAIRBROTHER & FALES

Sole Owner and Manufacturer of

Page's Patent Lace Leather,

And Manufacturer of
OAK BELTING,

Also, Picker or Moccasin Leather, for Boot and Shoe Packs.

Angular Belting and Pullies made to order.

PAWTUCKET, R. I.

Ask for Star Stamped Lace Leather.

New Patent "X" Razor Strap.

PATENTED DECEMBER 23, 1873.

This Strap, designated on our List as Letter "X," is of novel construction—is elastic, pleasantly yielding to the razor—gives a keen fine edge—is made of superior stock—is furnished at a low price—and gives universal satisfaction.

ITS PRICE SELLS IT.

BENJAMIN F. BADGER, Sole Manufacturer,

Badger Place, Charlestown, Mass.

Pipe, Fittings, &c.

National Tube Works Co.,

BOSTON, MASS. and McKEESPORT, PA.,

MANUFACTURERS OF

Best Quality Lap Welded Iron Boiler Tubes,

STEAM AND GAS PIPE,

Artesian Oil and Salt Well Tubing and Casing,

With Patent Protecting Coupling;

Mack's Patent Injector for Feeding Boilers.

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McKeesport.

WM. S. EATON, Treasurer,

Boston.

New York Office and Warehouse 78 William cor. Liberty Street.

McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

BRASS COCKS

For STEAM, WATER and GAS.

Wrought Iron Pipe & Fittings, Plain and Galvanized

PLUMBERS' MATERIALS.

Illustrated Catalogue sent by express to the Trade on application.

Factory, Paterson, N. J.

56 John Street, N. Y.

PANCOAST & MAULE

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PHILADELPHIA.

WROUGHT IRON PIPE

FITTINGS, BRASS & IRON VALVES & COCKS

TOOLS & STEAM FITTERS SUPPLIES &c.

PIPE CUT & FITTED TO PLANS FOR MILLS &c.

CONTRACTORSFOR HIGH & LOW PRESSURE STEAM HEATING
APPARATUS FOR ALL CLASSES OF BUILDINGS.

Send for Illustrated Catalogue.

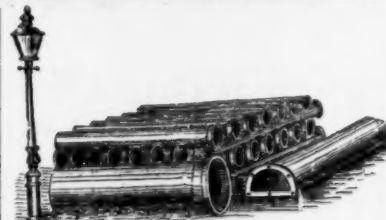


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Wholesale Manufacturer of

Coal Hods, Fire Shovels, etc.

311 Cherry St., PHILADELPHIA.

**R. D. WOOD & CO.,**

Philadelphia,

Manufacturers of

Cast Iron Pipe

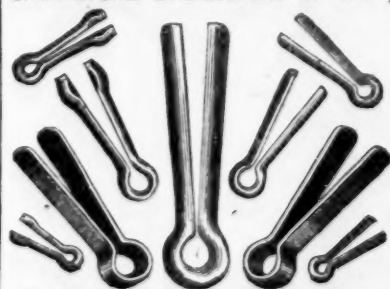
FOR WATER AND GAS.

FOR WATER AND GAS.

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PHILLIPSBURG NEW JERSEY.

GEORGE BARNES & CO.,

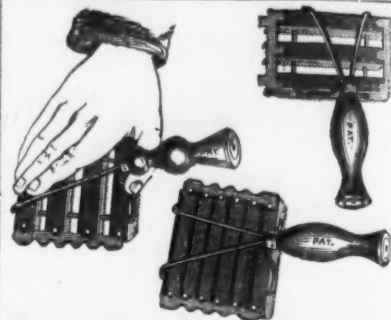
Manufacturers, Syracuse, N. Y.

ENCAUSTIC TILES.

ALEXANDER FINDLAY,

Importer,

99 MAIDEN LANE, N. Y.

Sole Agent in the U. S. for
CRAVEN, DUNNILL & CO., (Limited.)**The Perfect Comb.**

We call your attention specially to our new patent end-less wire frame comb. The result of a long series of experiments, made with a view to meeting all the requirements of a Perfect Comb. It is better, stronger, and more durable than any ever before invented. The raised wire shank gives what has never before been attained, viz: a rest and brace for the thumb, in such a position that the hand cannot come in contact with the horse and durability in a direction never heretofore attained, and at the same time serve as an extra handle; and when clasped by the fingers in connection with the raised shank the comb is more firmly, easily, and completely held, and with much less fatigue to the hand than is possible in any other formation—in short, it needs but a trial to vindicate its name: The Perfect Comb.

THE LAWRENCE COMB CO.

Factory and Office,

382 2d Ave., cor. 22d St., N. Y.

WILLIAMS WHITE & CHURCHILL

Successors to

MACKRELL & RICHARDSON MFG. COMPANY

Manufacturers of

Builders' Hardware,

Locks, Hinges, Hooks and Staples,

Awning Hooks, Meat Hooks, Pincers,

Champion Noiseless Pulleys,

CHAIN PULLEYS &c.

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Warehouse, 73 Warren St., N. Y.

WM. S. CARR & CO.

Sole Manufacturers of

CARR'S

Patent Water Closets,

PUMPS, &c.

Cabinet Wood Work, Vases, &c

108, 108 & 110 Centre Street,

Factory, Mott Haven, New York.

J. AUSTIN & CO.,

168 Fulton Street, N. Y.,

Proprietors and Manufacturers of

WHEATCROFT'S SELF-ADJUSTING

**Pipe Wrench,**

AND

Scripture's Funnel Top
MACHINE OILERS.

Dealers in

STEAM AND GAS FITTERS TOOLS.

RIEHL BROTHERS.

Ninth Street, near Coates, Philadelphia.

New York Store, 92 Liberty Street.

Pittsburgh Store, 285 Liberty Street.



"Patented" Furnace Charging Scale.

Double Beam R. R. Truck Scale, Compound Parallel Crane Scales, &c. Patented First Power Lever Wagon Scales. Testing Machines any capacity.

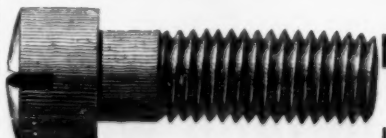
Chapman Valve Mfg. Co.,**STEAM VALVES,**

Iron and Composition, of all sizes.

WATER and GAS Gates, 3 to 48 inches

HYDRANTS.

Office and Warehouse, 75 & 77 Kilby St., Boston, Mass

**TURNED
MACHINE SCREWS,**

One-sixteenth to five-eighths diameter.

Heads and points to sample.

IRON, STEEL and BRASS.

Lyon & Fellows Mfg. Co.,

Cor. 1st and North 3d Streets, Williamsburgh, N. Y.

Fire Brick.

B. KREISCHER & SON

D. REISCHER & SON,

Portable Water Wheels—Mine-Drilling.

Since the days when the great English engineer (Stephenson) made steam-power not only portable but locomotive, portable powers have generally been associated in men's minds with steam. On the other hand, water-powers and water-wheels have been considered as permanent and local as the stream, or indeed, the mill site itself. Water-power has been the "mountain" which would not come to the manufacturing "Mahomet," and therefore, for many years, the said Mahomet has come to the mountain.

Now, however, the application of small streams and high falls to small turbines in the East, and the great ditches and sluices, flumes and tunnels of the West, conveying water miles from its source, has so changed all this that water-power also has become practically portable and even peripatetic, though not as yet locomotive.

Let us look a little at the steps leading to this really wonderful result.

The turbine water-wheel was early found to be well adapted to a low fall where neither over shot nor breast wheels could be used. In such localities an abundance of water on a large wheel supplied the want of a higher fall, and, while it gave a slow and steady motion, gave great power. The problem of getting a high rate of speed from large power, although slow motion, by gearing up or taking off from large to small pulleys, was solved long ago and found to be practicable. But the truth, of course, of that proposition, that is the belting down (if one may so term it) of a high rate of speed so as to get from it great power, was not so well ascertained. It was known that a light stream and high fall on a small Turbine of from 10 to 15 inches in diameter, would produce a lightning like speed. But could this speed be checked and converted into power? was the question. It was an interesting problem not only to scientists but to practical millwrights. At Utica, N. Y., is a small stream falling over the steep face of a high hill, furnishing a small but even amount of water, and having a vertical fall of more than 95 feet. At the foot of the hill stands a large flour mill with four run of $4\frac{1}{2}$ feet burrs and all its elevators, separators, smelters, packers and other machinery. A Leffel Turbine wheel of $5\frac{1}{2}$ inches in diameter, made of steel and brass, and finished and polished to the last degree, so reduced as to use only the water of an $11\frac{1}{2}$ inch wheel, was put in and the water brought in iron pipes from the mountain top to the wheel with the pressure of 95 feet fall. On the upright shaft of the wheel was secured a pulley of 26 inch face, on which worked a belt of equal width, connecting the wheel with the whole machinery of the mill, whereby the owner undertook to control and check the great speed of the wheel, and tame and calm it down to doing the work of that large mill; and he did it. The success was perfect, and the owner of the mill is confident that that little wheel will run two more pair of burrs.

Thus the way was paved for making a water-wheel portable, as all must see that to be portable at all a wheel must be small and light.

The conditions being so, it only remained to await the time, place and occasion, to still further extend the utility of water-wheels, and California has furnished all of these. It was found in the mines there that hand drilling of blasting holes, three men to the pair (one to turn and two to strike) was an expensive process, and for some time past machines for drilling these holes, driven by power, have been substituted for hand work, the Diamond, the Burleigh and the Blatchly being the drills chiefly used up to date. At first they undertook to run these drills by steam-power, but the heat from the steam pipes, added to the already great heat of many mines, rendered the tunnels and drifts untenable for the miners. Next, compressed air was tried, but the great cost of the plant for this power rendered it unsuitable to mining work in many places. But the great ditches and sluices for furnishing water for washing gold and for hydraulic mining were far up on the mountain side, and the necessary high fall secured, while the small size and light weight of the turbine wheel rendered it possible to place one on a drill car; so, on the track, extending into the mining tunnel, a car is placed, the drill machinery on its front end and the turbine water-wheel on its rear end. Thus equipped the car is moved along the track to the breast of the drift or tunnel; the water, brought from the ditch on the mountain side above, in iron pipes to the mouth of the tunnel, is concentrated through hose along the tunnel and applied to the water-wheel on the rear end of the drill car, thus, economically and pleasantly to all concerned, driving the drills. When the holes are bored the hose is detached, the drill-car moved back and switched on to a side track in an enlargement of the tunnel until the blasts are made, the rock car brought in and the debris removed, when it is ready to repeat the operation. In some places, where water is scarce and "miners' inches" high in price, a waste-pipe or hose takes the water from below the wheel to a tank at the tunnel's mouth; a steam pump forces it to a reservoir above, whence it is again let into the supply pipe and so used over again indefinitely.

This rendering of the water wheel itself portable, and enabling it to do its work at the very place where the work is needed, seems a greater triumph of ingenuity and invention than the bringing of water, which supplies its motive power, so far from its native source.—*Mining and Science.*

The large and highly productive iron ore bed of the Iron-ton Railroad Company, at Iron-ton, Lehigh county, Pa., covering a space of several acres, has for the past four weeks been standing under water to a depth of at least 15 feet, in consequence of which operations have, out of necessity, been at a standstill.



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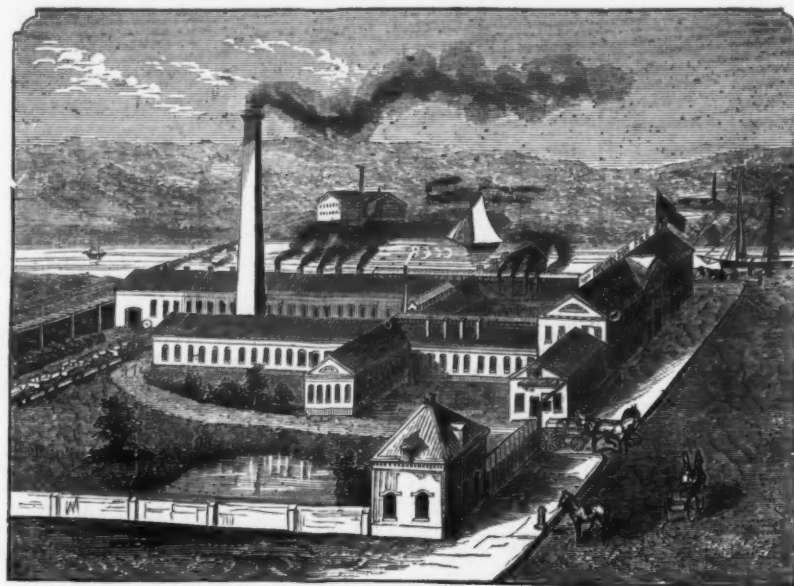
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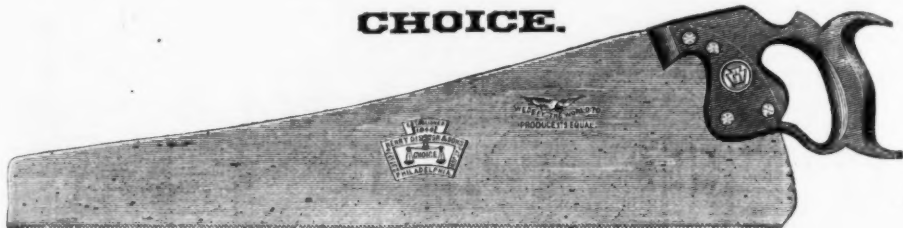
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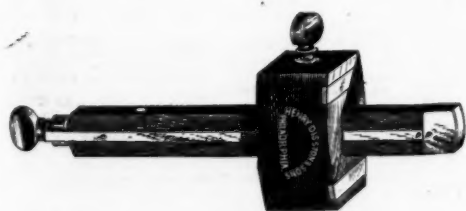


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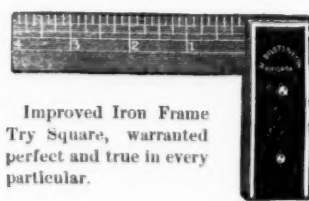
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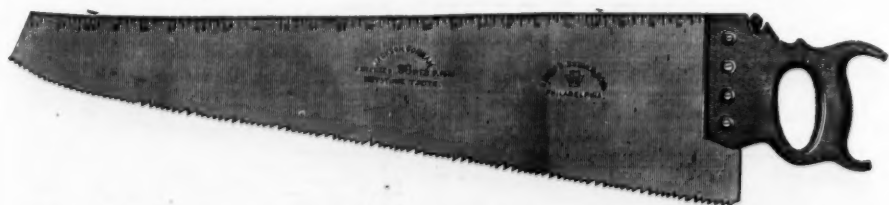


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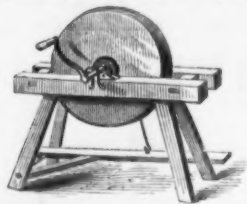
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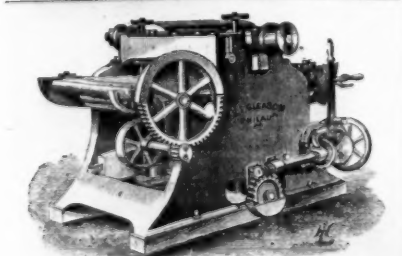
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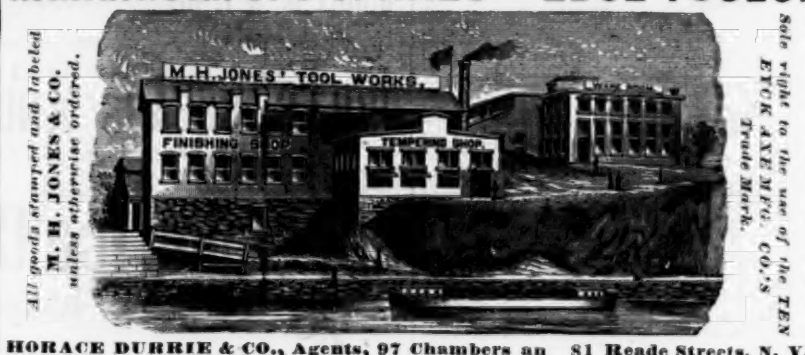
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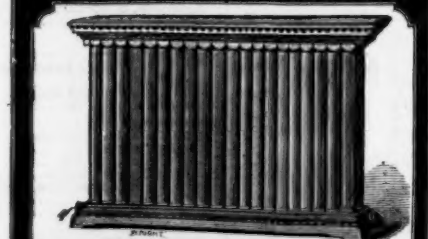
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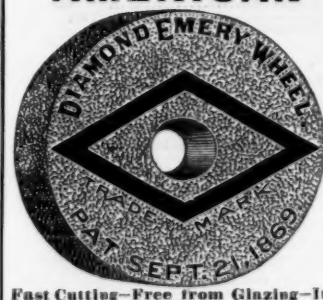
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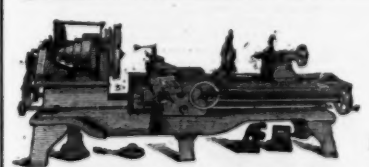
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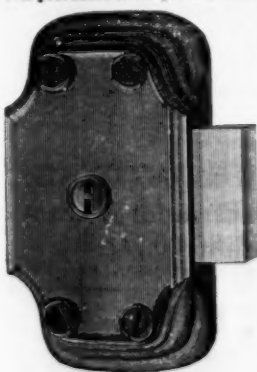
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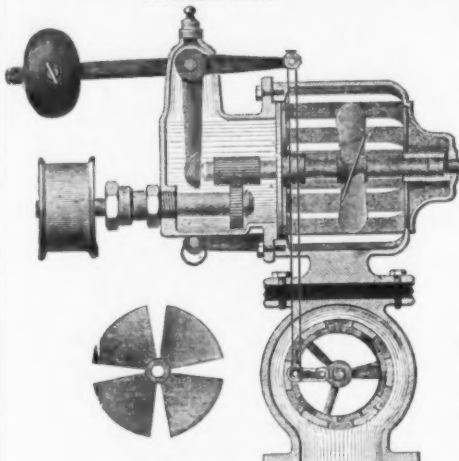
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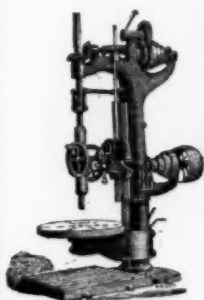
Sectional View.

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ment at Treasury Department, State
and Custom Houses, Navy Yards
and U. S. Vessels.Also by leading manufacturing establish-
ments, Rolling, Saw and Paper Mills, Tan-
neries, etc., throughout the country, where
the most positive uniform speed is required.The use of this Governor insures
A positive saving in Steam of
from 10 to 20 per cent.

over any other Governor in use.

This Governor possesses no character-
istics in common with others, either in prin-
ciple or operation. We refrain, therefore,
from entering into comparisons. The Cen-
trifugal or Ball Principle is entirely aban-
doned in this invention, and the valve lever
is sustained with the same velocity in one
position as another. No matter how
great, violent or sudden may be the
changes of load, we warrant it to**Absolutely Govern the Engine,**which will run uninfluenced by the varying pressure of steam, be it thirty or eighty pounds.
In a moment's time the revolutions of the driving wheel can be changed to exactly the speed required
without stopping any of the mechanism, remaining perfectly governed wherever set.**These Governors are fully Warranted in every Particular.**

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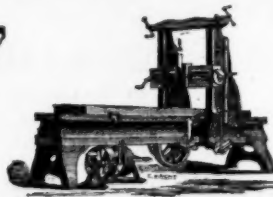
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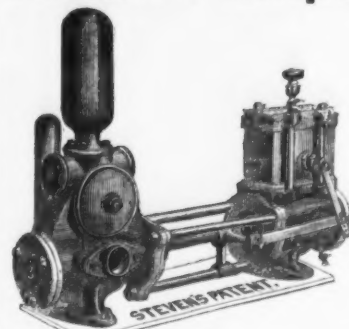
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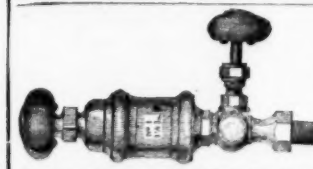
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**Bennett Hotchkiss and**
N. C. Stiles' Patent.This Drop (which has been illustrated in this journal
of that class in which the Hammer is raised by a stiff
belt or board passing up between two friction rolls, and
is so well known that we will only describe our improve-
ments. The patents we are working under are those of
BENNETT HOTCHKISS (who in an interference case with
Goulding and Cheney was declared the first inventor) and
N. C. STILES. Our improvements consist of—First.—Of an arrangement of parts that makes it the
most complete Jobbing Hammer, and will take the place
to a great extent, of all other tools for forging. In ad-
dition to the upright rod, which is operated by the ham-
mer to open and close the rolls, we place another rod
the lower end of which is secured to the end of a lever
which is operated by the hand or foot, which operation
also, opens any closes the rolls at will. The lower end of
this rod has a slot, so that the action of the hammer will
not disturb the hand lever, thereby preventing the hand
being injured, as otherwise would be the case.Second.—No dog is used on the upright, to hold up the
hammer. The belt or board passes up between two
cam-rollers under the rolls, so arranged that as the
hammer falls they will freely open of themselves, but
as they rise they will close and hold up the hammer.
To let the hammer fall the clamps are opened by pres-
sure upon the foot treadle.Third.—The board or belt is secured to the hammer by
an elastic connection, which prevents the sudden jar and
destruction of the same. The back roll is made adjust-
able to different thicknesses of board or belt, as also are
the clamps. An adjustable collar on the upright rod al-
lows the operator to obtain any height of blow desired
automatically. If one blow is wanted, press upon the
treadle and remove the pressure as soon as the blow is
given. Keep the foot upon the treadle and the blows
will be repeated until the pressure is removed. If a
blow of less height than the collar is set for is required
work the hand lever, which will give you any height of
blow desired. The hammer can be held up at any point
below the collar by bringing the hand lever into action
when the hammer is at the desired height, so that the
next blow can be given from a state of rest, of less height
than the collar is set for. This is a feature no other drop
has; that is, the first blow struck can be of less height
than the second or third, and obtained from a state of
rest. A gentle pressure upon the treadle will allow the
hammer to go down slowly, but it will stop and remain
suspended at any point as soon as the pressure is re-
moved.The clamps in holding up the hammer keep the bar
from touching either roll and prevents the same from
being worn uneven.

Manufactured only by the

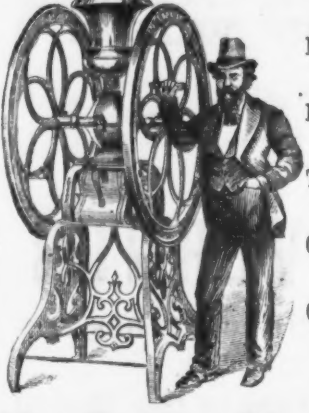
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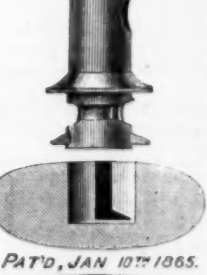
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Richmond (polished face).....	per lb. 35c
Stone.—Arkansas Oil, No. 1.....	1 1/2c
Turkey Oil, No. 1.....	1 1/2c
Washita Extra.....	2c
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No. 2.....	1c
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No. 24.....	1c
No. 25.....	1c
No. 26.....	1c
No. 27.....	1c
No. 28.....	1c
No. 29.....	1c
No. 30.....	1c
No. 31.....	1c
No. 32.....	1c
No. 33.....	1c
No. 34.....	1c
No. 35.....	1c
No. 36.....	1c
No. 37.....	1c
No. 38.....	1c
No. 39.....	1c
No. 40.....	1c
No. 41.....	1c
No. 42.....	1c
No. 43.....	1c
No. 44.....	1c
No. 45.....	1c
No. 46.....	1c
No. 47.....	1c
No. 48.....	1c
No. 49.....	1c
No. 50.....	1c
No. 51.....	1c
No. 52.....	1c
No. 53.....	1c
No. 54.....	1c
No. 55.....	1c
No. 56.....	1c
No. 57.....	1c
No. 58.....	1c
No. 59.....	1c
No. 60.....	1c
No. 61.....	1c
No. 62.....	1c
No. 63.....	1c
No. 64.....	1c
No. 65.....	1c
No. 66.....	1c
No. 67.....	1c
No. 68.....	1c
No. 69.....	1c
No. 70.....	1c
No. 71.....	1c
No. 72.....	1c
No. 73.....	1c
No. 74.....	1c
No. 75.....	1c
No. 76.....	1c
No. 77.....	1c
No. 78.....	1c
No. 79.....	1c
No. 80.....	1c
No. 81.....	1c
No. 82.....	1c
No. 83.....	1c
No. 84.....	1c
No. 85.....	1c
No. 86.....	1c
No. 87.....	1c
No. 88.....	1c
No. 89.....	1c
No. 90.....	1c
No. 91.....	1c
No. 92.....	1c
No. 93.....	1c
No. 94.....	1c
No. 95.....	1c
No. 96.....	1c
No. 97.....	1c
No. 98.....	1c
No. 99.....	1c
No. 100.....	1c

Galvanized Iron.—Full bundles.....	No. 25.....	dis 25 1/2
No. 15 to 20.....	No. 20.....	dis 25 1/2
No. 20 to 24.....	No. 24.....	dis 25 1/2
No. 24 to 28.....	No. 28.....	dis 25 1/2
No. 28 to 32.....	No. 32.....	dis 25 1/2
No. 32 to 36.....	No. 36.....	dis 25 1/2
No. 36 to 40.....	No. 40.....	dis 25 1/2
No. 40 to 44.....	No. 44.....	dis 25 1/2
No. 44 to 48.....	No. 48.....	dis 25 1/2
No. 48 to 52.....	No. 52.....	dis 25 1/2
No. 52 to 56.....	No. 56.....	dis 25 1/2
No. 56 to 60.....	No. 60.....	dis 25 1/2
No. 60 to 64.....	No. 64.....	dis 25 1/2
No. 64 to 68.....	No. 68.....	dis 25 1/2
No. 68 to 72.....	No. 72.....	dis 25 1/2
No. 72 to 76.....	No. 76.....	dis 25 1/2
No. 76 to 80.....	No. 80.....	dis 25 1/2
No. 80 to 84.....	No. 84.....	dis 25 1/2
No. 84 to 88.....	No. 88.....	dis 25 1/2
No. 88 to 92.....	No. 92.....	dis 25 1/2
No. 92 to 96.....	No. 96.....	dis 25 1/2
No. 96 to 100.....	No. 100.....	dis 25 1/2
No. 100 to 104.....	No. 104.....	dis 25 1/2
No. 104 to 108.....	No. 108.....	dis 25 1/2
No. 108 to 112.....	No. 112.....	dis 25 1/2
No. 112 to 116.....	No. 116.....	dis 25 1/2
No. 116 to 120.....	No. 120.....	dis 25 1/2
No. 120 to 124.....	No. 124.....	dis 25 1/2
No. 124 to 128.....	No. 128.....	dis 25 1/2
No. 128 to 132.....	No. 132.....	dis 25 1/2
No. 132 to 136.....	No. 136.....	dis 25 1/2
No. 136 to 140.....	No. 140.....	dis 25 1/2
No. 140 to 144.....	No. 144.....	dis 25 1/2
No. 144 to 148.....	No. 148.....	dis 25 1/2
No. 148 to 152.....	No. 152.....	dis 25 1/2
No. 152 to 156.....	No. 156.....	dis 25 1/2
No. 156 to 160.....	No. 160.....	dis 25 1/2
No. 160 to 164.....	No. 164.....	dis 25 1/2
No. 164 to 168.....	No. 168.....	dis 25 1/2
No. 168 to 172.....	No. 172.....	dis 25 1/2
No. 172 to 176.....	No. 176.....	dis 25 1/2
No. 176 to 180.....	No. 180.....	dis 25 1/2
No. 180 to 184.....	No. 184.....	dis 25 1/2
No. 184 to 188.....	No. 188.....	dis 25 1/2
No. 188 to 192.....	No. 192.....	dis 25 1/2
No. 192 to 196.....	No. 196.....	dis 25 1/2
No. 196 to 200.....	No. 200.....	dis 25 1/2
No. 200 to 204.....	No. 204.....	dis 25 1/2
No. 204 to 208.....	No. 208.....	dis 25 1/2
No. 208 to 212.....	No. 212.....	dis 25 1/2
No. 212 to 216.....	No. 216.....	dis 25 1/2
No. 216 to 220.....	No. 220.....	dis 25 1/2
No. 220 to 224.....	No. 224.....	dis 25 1/2
No. 224 to 228.....	No. 228.....	dis 25 1/2
No. 228 to 232.....	No. 232.....	dis 25 1/2
No. 232 to 236.....	No. 236.....	dis 25 1/2
No. 236 to 240.....	No. 240.....	dis 25 1/2
No. 240 to 244.....	No. 244.....	dis 25 1/2
No. 244 to 248.....	No. 248.....	dis 25 1/2
No. 248 to 252.....	No. 252.....	dis 25 1/2
No. 252 to 256.....	No. 256.....	dis 25 1/2
No. 256 to 260.....	No. 260.....	dis 25 1/2
No. 260 to 264.....	No. 264.....	dis 25 1/2
No. 264 to 268.....	No. 268.....	dis 25 1/2
No. 268 to 272.....	No. 272.....	dis 25 1/2
No. 272 to 276.....	No. 276.....	dis 25 1/2
No. 276 to 280.....	No. 280.....	dis 25 1/2
No. 280 to 284.....	No. 284.....	dis 25 1/2
No. 284 to 288.....	No. 288.....	dis 25 1/2
No. 288 to 292.....	No. 292.....	dis 25 1/2
No. 292 to 296.....	No. 296.....	dis 25 1/2
No. 296 to 300.....	No. 300.....	dis 25 1/2
No. 300 to 304.....	No. 304.....	dis 25 1/2
No. 304 to 308.....	No. 308.....	dis 25 1/2
No. 308 to 312.....	No. 312.....	dis 25 1/2
No. 312 to 316.....	No. 316.....	dis 25 1/2
No. 316 to 320.....	No. 320.....	dis 25 1/2
No. 320 to 324.....	No. 324.....	dis 25 1/2
No. 324 to 328.....	No. 328.....	dis 25 1/2
No. 328 to 332.....	No. 332.....	dis 25 1/2
No. 332 to 336.....	No. 336.....	dis 25 1/2
No. 336 to 340.....	No. 340.....	dis 25 1/2
No. 340 to 344.....	No. 344.....	dis 25 1/2
No. 344 to 348.....	No. 348.....	dis 25 1/2
No. 348 to 352.....	No. 352.....	dis 25 1/2
No. 352 to 356.....	No. 356.....	dis 25 1/2
No. 356 to 360.....	No. 360.....	dis 25 1/2
No. 360 to 364.....	No. 364.....	dis 25 1/2
No. 364 to 368.....	No. 368.....	dis 25 1/2
No. 368 to 372.....	No. 372.....	dis 25 1/2
No. 372 to 376.....	No. 376.....	dis 25 1/2
No. 376 to 380.....	No. 380.....	dis 25 1/2
No. 380 to 384.....	No. 384.....	dis 25 1/2
No. 384 to 388.....	No. 388.....	dis 25 1/2
No. 388 to 392.....	No. 392.....	dis 25 1/2
No. 392 to 396.....	No. 396.....	dis 25 1/2
No. 396 to 400.....	No. 400.....	dis 25 1/2
No. 400 to 404.....	No. 404.....	dis 25 1/2
No. 404 to 408.....	No. 408.....	dis 25 1/2
No. 408 to 412.....	No. 412.....	dis 25 1/2
No. 412 to 416.....	No. 416.....	dis 25 1/2
No. 416 to 420.....	No. 420.....	dis 25 1/2
No. 420 to 424.....	No. 424.....	dis 25 1/2
No. 424 to 428.....	No. 428.....	dis 25 1/2
No. 428 to 432.....	No. 432.....	dis 25 1/2
No. 432 to 436.....	No. 436.....	dis 25 1/2
No. 436 to 440.....	No. 440.....	dis 25 1/2
No. 440 to 444.....	No. 444.....	dis 25 1/2
No. 444 to 448.....	No. 448.....	dis 25 1/2
No. 448 to 452.....	No. 452.....	dis 25 1/2
No. 452 to 456.....	No. 456.....	dis 25 1/2
No. 456 to 460.....	No. 460.....	dis 25 1/2
No. 460 to 464.....	No. 464.....	dis 25 1/2
No. 464 to 468.....	No. 468.....	dis 25 1/2
No. 468 to 472.....	No. 472.....	dis 25 1/2
No. 472 to 476.....	No. 476.....	dis 25 1/2
No. 476 to 480.....	No. 480.....	dis 25 1/2
No. 480 to 484.....	No. 484.....	dis 25 1/2
No. 484 to 488.....	No. 488.....	dis 25 1/2
No. 488 to 492.....	No. 492.....	dis 25 1/2
No. 492 to 496.....	No. 496.....	dis 25 1/2
No. 496 to 500.....	No. 500.....	dis 25 1/2
No. 500 to 504.....	No. 504.....	dis 25 1/2
No. 504 to 508.....	No. 508.....	dis 25 1/2
No. 508 to 512.....	No. 512.....	dis 25 1/2
No. 512 to 516.....	No. 516.....	dis 25 1/2
No. 516 to 520.....	No. 520.....	dis 25 1/2
No. 520 to 524.....	No. 524.....	dis 25 1/2
No. 524 to 528.....	No. 528.....	dis 25 1/2
No. 528 to 532.....	No. 532.....	dis 25 1/2
No. 532 to 536.....	No. 536.....	dis 25 1/2
No. 536 to 540.....	No. 540.....	dis 25 1/2
No. 540 to 544.....	No. 544.....	dis 25 1/2
No. 544 to 548.....	No. 548.....	dis 25 1/2
No. 548 to 552.....	No. 552.....	dis 25 1/2
No. 552 to 556.....	No. 556.....	dis 25 1/2
No. 556 to 560.....	No. 560.....	dis 25 1/2
No. 560 to 564.....	No. 564.....	dis 25 1/2
No. 564 to 568.....	No. 568.....	dis 25 1/2
No. 568 to 572.....	No. 572.....	dis 25 1/2
No. 572 to 576.....	No. 576.....	dis 25 1/2
No. 576 to 580.....	No. 580.....	dis 25 1/2
No. 580 to 584.....	No. 584.....	dis 25 1/2
No. 584 to 588.....	No. 588.....	dis 25 1/2
No. 588 to 592.....	No. 592.....	dis 25 1/2
No. 592 to 596.....	No. 596.....	dis 25 1/2
No. 596 to 600.....	No. 600.....	dis 25 1/2
No. 600 to 604.....	No. 604.....	dis 25 1/2
No. 604 to 608.....	No. 608.....	dis 25 1/2
No. 608 to 612.....	No. 612.....	dis 25 1/2
No. 612 to 616.....	No. 616.....	dis 25 1/2
No. 616 to 620.....	No. 620.....	dis 25 1/2
No. 620 to 624.....	No. 624.....	dis 25 1/2
No. 624 to 628.....	No. 628.....	dis 25 1/2
No. 628 to 632.....	No. 632.....	dis 25 1/2
No. 632 to 636.....	No. 636.....	dis 25 1/2
No. 636 to 640.....	No. 640.....	dis 25 1/2
No. 640 to 644.....	No. 644.....	dis 25 1/2
No. 644 to 648.....	No. 648.....	dis 25 1/2
No. 648 to 652.....	No. 652.....	dis 25 1/2
No. 652 to 656.....	No. 656.....	dis 25 1/2
No. 656 to 660.....	No. 660.....	dis 25 1/2
No. 660 to 664.....	No. 664.....	dis 25 1/2
No. 664 to 668.....	No. 668.....	dis 25 1/2
No. 668 to 672.....	No. 672.....	dis 25 1/2
No. 672 to 676.....	No. 676.....	dis 25 1/2
No. 676 to 680.....	No. 680.....	dis 25 1/2
No. 680 to 684.....	No. 684.....	dis 25 1/2
No. 684 to 688.....	No. 688.....	dis 25 1/2
No. 688 to 692.....	No. 692.....	dis 25 1/2
No. 692 to 696.....	No. 696.....	dis 25 1/2
No. 696 to 700.....	No. 700.....	dis 25 1/2
No. 700 to 704.....	No. 704.....	dis 25 1/2
No. 704 to 708.....	No. 708.....	dis 25 1/2
No. 708 to 712.....	No. 712.....	dis 25 1/2
No. 712 to 716.....	No. 716.....	dis 25 1/2
No. 716 to 720.....	No. 720.....	dis 25 1/2
No. 720 to 724.....	No. 724.....	dis 25 1/2
No. 724 to 728.....	No. 728.....	dis 25 1/2
No. 728 to 732.....	No. 732.....	dis 25 1/2
No. 732 to 736.....	No. 736.....	dis 25 1/2
No. 736 to 740.....	No. 740.....	dis 25 1/2
No. 740 to 744.....	No. 744.....	dis 25 1/2
No. 744 to 748.....	No. 748.....	dis 25 1/2
No. 748 to 752.....	No. 752.....	dis 25 1/2
No. 752 to 756.....	No. 756.....	dis 25 1/2
No. 756 to 760.....	No. 760.....	dis 25 1/2
No. 760 to 764.....	No. 764.....	dis 25 1/2
No. 764 to 768.....	No. 768.....	dis 25 1/2
No. 768 to 772.....	No. 772.....	dis 25 1/2
No. 772 to 776.....	No. 776.....	dis 25 1/2
No. 776 to 780.....	No. 780.....	dis 25 1/2
No. 780 to 784.....	No. 784.....	dis 25 1/2
No. 784 to 788.....	No. 788.....	dis 25 1/2
No. 788 to 792.....	No. 792.....	dis 25 1/2
No. 792 to 796.....	No. 796.....	dis 25 1/2
No. 796 to 800.....	No. 800.....	dis 25 1/2
No. 800 to 804.....	No. 804.....	dis 25 1/2
No. 804 to 808.....	No. 808.....	dis 25 1/2
No. 808 to 812.....	No. 812.....	dis 25 1/2
No. 812 to 816.....	No. 816.....	dis 25 1/2
No. 816 to 820.....	No. 820.....	dis 25 1/2
No. 820 to 824.....	No. 824.....	dis 25 1/2
No. 824 to 828.....	No. 828.....	dis 25 1/2
No. 828 to 832.....	No. 832.....	dis 25 1/2
No. 832 to 836.....	No. 836.....	dis 25 1/2
No. 836 to 840.....	No. 840.....	dis 25 1/2
No. 840 to 844.....	No. 844.....	dis 25 1/2
No. 844 to 848.....	No. 848.....	dis 25 1/2
No. 848 to 852.....	No. 852.....	dis 25 1/2
No. 852 to 856.....	No. 856.....	dis 25 1/2
No. 856 to 860.....	No. 860.....	dis 25 1/2
No. 860 to 864.....	No. 864.....	dis 25 1/2
No. 864 to 868.....	No. 868.....	dis 25 1/2
No. 868 to 872.....	No. 872.....	dis 25 1/2
No. 872 to 876.....	No. 876.....	dis 25 1/2
No. 876 to 880.....	No. 880.....	dis 25 1/2
No. 880 to 884.....	No. 884.....	dis 25 1/2
No. 884 to 888.....	No. 888.....	dis 25 1/2
No. 888 to 892.....	No. 892.....	dis 25 1/2
No. 892 to 896.....	No. 896.....	dis 25 1/2
No. 896 to 900.....	No. 900.....	dis 25 1/2
No. 900 to 904.....	No. 904.....	dis 25 1/2
No. 904 to 908.....	No. 908.....	dis 25 1/2
No. 908 to 912.....	No. 912.....	dis 25 1/2
No. 912 to 916.....	No. 916.....	dis 25 1/2
No. 916 to 920.....	No. 920.....	dis 25 1/2
No. 920 to 924.....	No. 924.....	dis 25 1/2
No. 924 to 928.....	No. 928.....	dis 25 1/2
No. 928 to 932.....	No. 932.....	dis 25 1/2
No. 932 to 936.....	No. 936.....	dis 25 1/2
No. 936 to 940.....	No. 940.....	dis 25 1/2
No. 940 to 944.....	No. 944.....	dis 25 1/2
No. 944 to 948.....	No. 948.....	dis 25 1/2
No. 948 to 952.....	No. 952.....	dis 25 1/2
No. 952 to 956.....	No. 956.....	dis 25 1/2
No. 956 to 960.....	No. 960.....	dis 25 1/2
No. 960 to 964.....	No. 964.....	dis 25 1/2
No. 964 to 968.....	No. 968.....	dis 25 1/2
No. 968 to 972.....	No. 972.....	dis 25 1/2
No. 972 to 976.....	No. 976.....	dis 25 1/2
No. 976 to 980.....	No. 980.....	dis 25 1/2
No. 980 to 984.....	No. 984.....	dis 25 1/2
No. 984 to 988.....	No. 988.....	dis 25 1/2
No. 988 to 992.....	No. 992.....	dis 25 1/2
No. 992 to 996.....	No. 996.....	dis 25 1/2
No. 996 to 1000.....	No. 1000.....	dis 25 1/2

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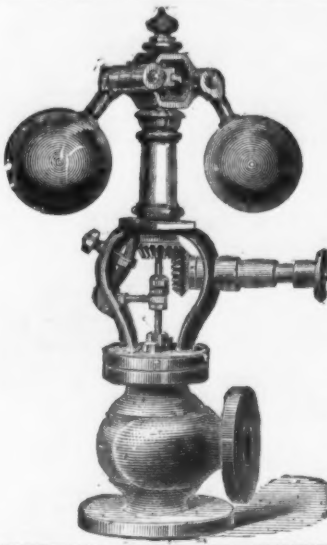
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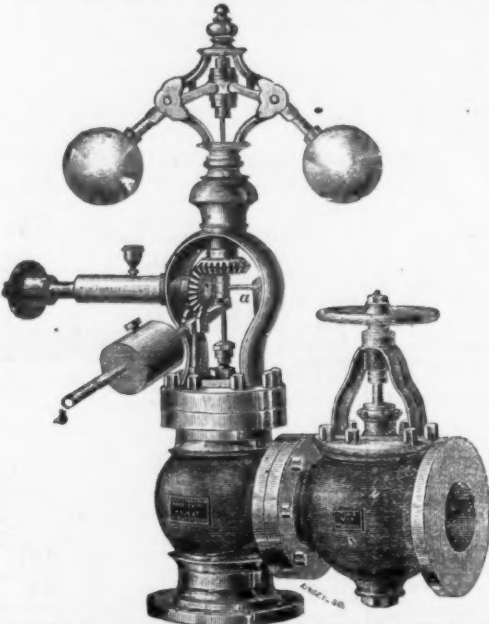
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1	18 00	20 00	17 00		
1 1/2	20 00	22 00	19 00		
2	24 00	27 00	22 00	2 50	5 25
2 1/2	26 00	29 00	24 00	3 00	6 00
3	34 00	38 00	31 00	3 50	8 50
3 1/2	41 00	46 00	38 00	4 25	11 50
4	47 00	54 00		4 25	16 00
4 1/2	50 00	57 00	47 00	3 50	17 00
5	55 00	62 00		3 75	19 00
5 1/2	62 00	70 00		4 25	22 00
6	71 00	80 00		4 50	27 00
6 1/2	81 00	92 00		5 00	32 00
7	91 00	103 00		5 50	37 00
7 1/2	103 00	114 00		6 00	42 00
8	116 00	129 00		6 50	48 00
8 1/2	134 00	148 00		7 00	55 00
9	160 00	176 00		8 00	60 00
9 1/2	190 00	219 00		9 00	85 00
10	230 00	255 00		10 00	

No Charge for Box and Carriage.

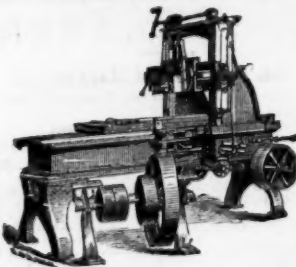
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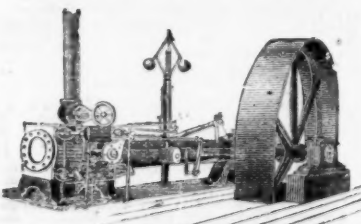
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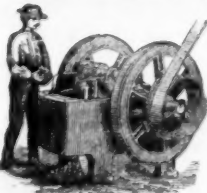
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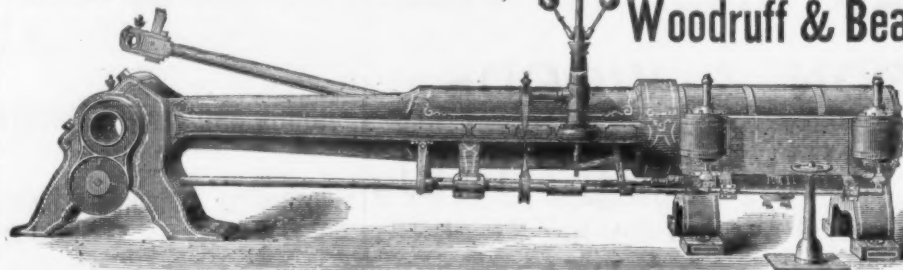
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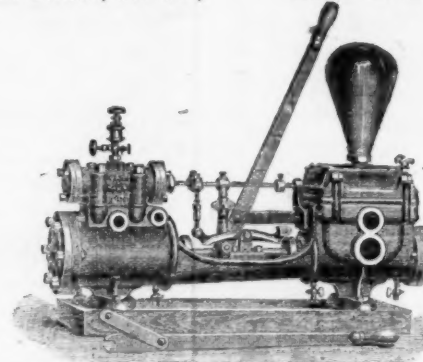
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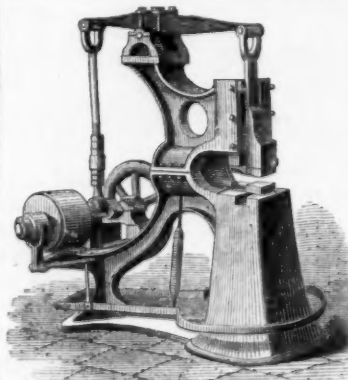


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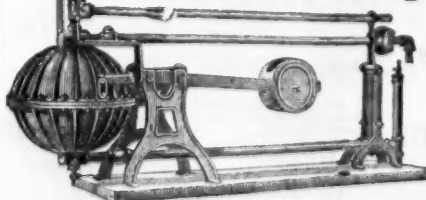


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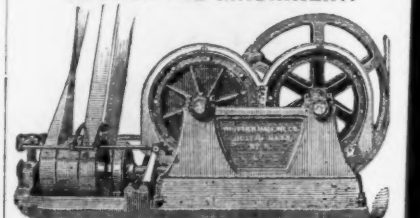
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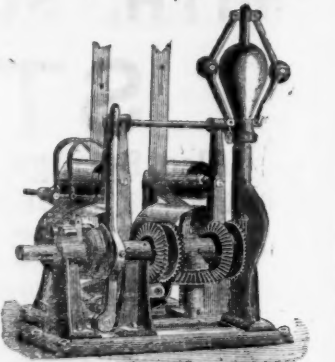
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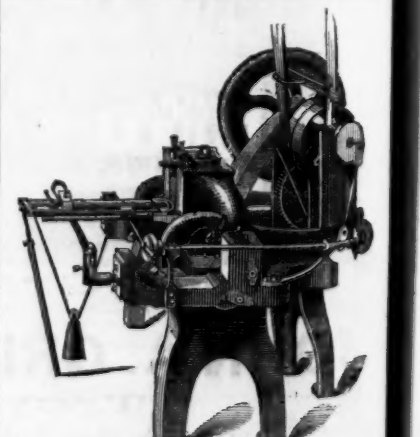
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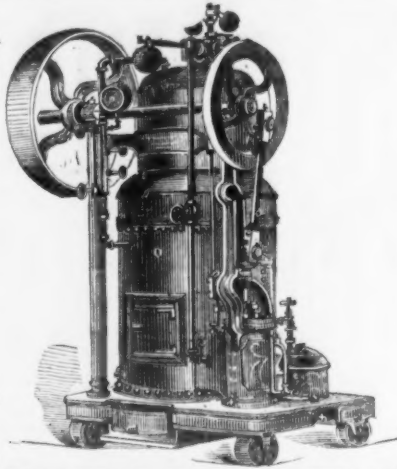
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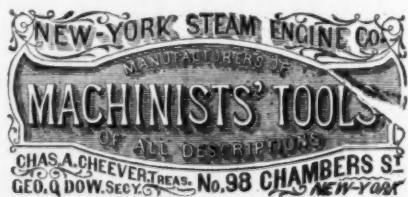
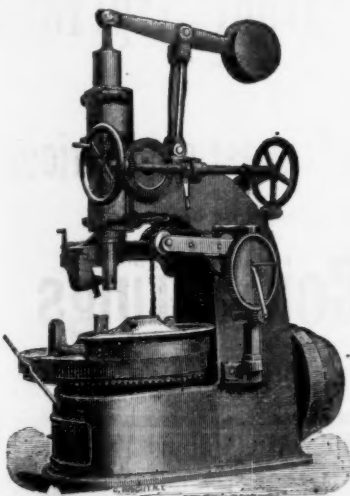
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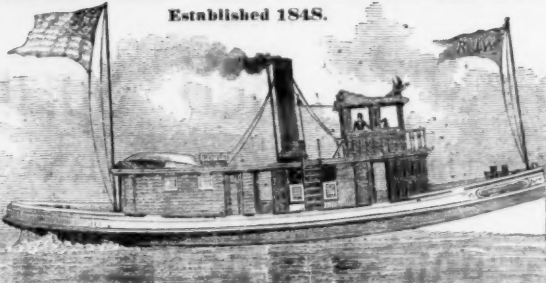
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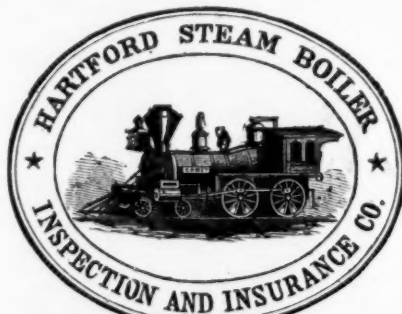
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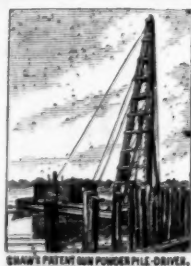
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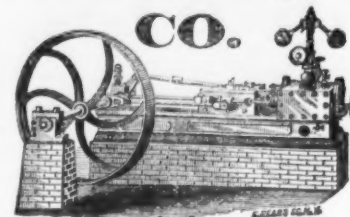
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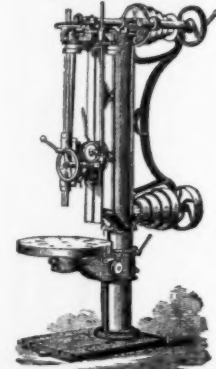
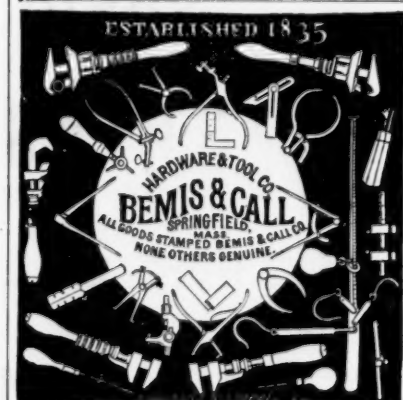
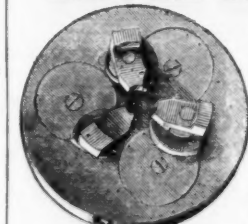
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